Migration in Canada
Regional Aspects

BY LEROY O. STONE

1961 CENSUS MONOGRAPH
DOMINION BUREAU OF STATISTICS

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Leroy O. Stone

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Foreword

The Canadian Censuses constitute a rich source of information about individuals and their families, extending over many years. The census data are used widely but it has proved to be worthwhile in Canada, as in some other countries, to supplement census statistical reports with analytical monographs on a number of selected topics. The 1931 Census was the basis of several valuable monographs but, for various reasons, it was impossible to follow this precedent with a similar programme until 1961. Moreover, the 1961 Census had two novel features. In the first place, it provided much new and more detailed data, particularly in such fields as income, internal migration and fertility, and secondly, the use of an electronic computer made possible a great variety of tabulations on which more penetrating analytical studies could be based.

The purpose of the 1961 Census Monograph Programme is to provide a broad analysis of social and economic phenomena in Canada. Although the monographs concentrate on the results of the 1961 Census, they are supplemented by data from previous censuses and by statistical material from other sources. In addition to *Migration in Canada* and a Series of Labour Force Studies, monographs will be or have been published on urban development, marketing, agriculture, fertility, income and immigration.

I should like to express my appreciation to the universities that have made it possible for members of their staff to contribute to this Programme, to authors within the Dominion Bureau of Statistics who have put forth extra effort in preparing their studies, and to a number of other members of DBS staff who have given assistance. The Census Monograph Programme is considered desirable not only because the analysis by the authors throws light on particular topics but also because it provides insight into the adequacy of existing data and guidance in planning the content and tabulation programmes of future censuses. Valuable help in designing the Programme was received from a committee of Government officials and university professors. In addition, thanks are extended to the various readers, experts in their fields, whose comments were of considerable assistance to the authors.

Although the monographs have been prepared at the request of and published by the Dominion Bureau of Statistics, responsibility for the analyses and conclusions is that of the individual authors.

Walter E. Duffett.

DOMINION STATISTICIAN.

Preface

This is the first of two volumes comprising the 1961 Census Monograph on Migration in Canada. It is dedicated to the late Dr. Yoshiko Kasahara, who was responsible for the migration monograph until her untimely death. Through numerous conversations and discussions of papers, the present author was an active professional colleague of Dr. Kasahara. There was much common ground between our approach as to population studies, particularly in regard to the emphasis on social and economic correlates of demographic variables and on the use of mathematical tools as aids to substantive research. Without doubt, the basic ideas advanced in this volume are largely in keeping with the spirit of Dr. Kasahara's thinking in regard to the analysis of migration. In addition, the author has used the unpublished 'print-outs' from the 1961 census tape files which Dr. Kasahara designed and requested for the monograph research, as well as some worksheets she processed from these unpublished census tabulations (many of the tables in Chapter Two are based on her worksheets). However, the design of the research on the data which she left and the preparation of manuscript are original.

In the effort to bring this project to a rapid and successful conclusion, one aspect of the work (emphasizing demographic patterns) was taken over by Dr. M.V. George of DBS and will appear as a separate volume. Professors Marvin McInnis and Douglas Curtis were invited to assume authorship of the chapters analysing economic aspects of provincial migration differentials and of rural farm migration patterns (Chapters Five and Six). Later all three authors prepared detailed criticisms on each other's drafts, which comments proved useful in eliminating any serious errors of interpretation that might have occurred. Of course, McInnis and Curtis are responsible only for those interpretations that appear in Chapters Five and Six, respectively. It is factual to add that they are not necessarily in agreement with statements made in other parts of the monograph, nor is the present author necessarily in agreement with everything they say.

The purposes of this monograph are to describe and partially analyse some major features of the pattern of migration flow among Canadian regions, and to give an account of some of the ways in which migrants comprise a distinctive socio-economic segment of the Canadian population. The conduct

of this work should make some contribution to the documentation and analysis of one of the important aspects of regional differentials in levels of living and development. By pointing up some of the useful information that can be gleaned through synthesis of census statistics, the monograph should help to make these statistics more valuable to the Canadian public. The 1961 census statistics should be particularly interesting because, despite their limitations, they present snapshots of Canadian migration that are unprecedented in their scope, coverage and detail. It must be emphasized, however, that this work is not definitive, because very substantial additions to the existing stock of Canadian migration statistics are needed for definitive analysis on the topics taken up here, but it is hoped that future research on Canadian migration will find in this volume a useful compendium of basic and relevant information.

The writer gratefully acknowledges the assistance received from Prof. J.W. Simmons, who read substantial sections of the manuscript. Also acknowledged with thanks is the co-operation from several sections and staff members of the DBS in the assembling and processing of data, including, among others, the Central Programming Division, the Census Computing Pool under Mrs. Muriel Ellis, the Main Library under Mr. B.A. Ower, the Typing Pool under Mr. S. Bogé, Mrs. E.M. Baldwin, Miss D. Hamilton and Mrs. P. Hayes. A number of DBS summer students and Queen's University students and staff contributed to this work, including Mr. Peter Annis, Miss Lucy Gorman, Mr. James Johnston, Mr. John Kelley, Mr. Richard Magid, Mr. Charles Pye, Mr. Andrew Siggner and Miss Wynn Smith. The writer is also greatly indebted to Mrs. Frances Aubry who directed the author's supporting staff and made major contributions to the timely completion of the work; to the Year Book Staff, particularly the Assistant Director, Miss Margaret Pink, who undertook the task of finally editing the copy and seeing the manuscript through the press; and to Mr. Laurent Tessier of the DBS Drafting Unit under whose direction the charts were drawn. For permission to quote from copyrighted publications the author thanks the American Philosophical Society, Philadelphia, McClelland & Stewart Ltd., Toronto, and the Macmillan Company of Canada Limited, Toronto.

The writers are solely responsible for the opinions expressed in the chapters or appendices they have drafted and for any blemishes of error or faulty judgement that may appear therein.

Leroy O. Stone,
Consultant on Demographic Research.

OTTAWA, 1969

Table of Contents

Page

Page

List of Tables

Page

Page

Page

Page

APPENDICES

Page

List of Charts

Page

Chapter One

INTRODUCTION

1.1 PURPOSE AND ORGANIZATION

This monograph attempts to describe and analyse partially some of the major patterns of migration in Canada. The work is based mainly on census statistics, particularly those from the 1961 Census of Canada. With the aim of providing a major focus on regional differentials in migration flow, the monograph studies measures of migration rates for provinces, urban areas, rural farm areas, rural non-farm areas, metropolitan areas, and counties or census divisions. The analysis of these measures emphasizes economic aspects of areal differentials in migration ratios, and there is a complementary emphasis on the socio-economic characteristics of migrants. Thus, the general theme of this work can be said to be the regional pattern and socio-economic aspects of migration in Canada. A second volume[1] (henceforth called 'the companion volume') will focus upon demographic aspects of migration in Canada.

Three general purposes should be at least partly served by the chosen theme of this volume. First, the monograph should make some contribution to the documentation of one of the important aspects of regional differences in levels of living and development. This contribution should be particularly timely in view of the growing concern with persistent disparities in development among Canadian regions (cf. Economic Council of Canada, 1965, c. 5). Secondly, the monograph should demonstrate some of the ways in which census migration statistics are useful as symptoms and measures of economic conditions in Canadian communities. In so doing it should indicate to the public some of the ways in which important information about Canada may be gleaned by synthesizing census statistics. Thirdly, by working somewhat intensively with the migration data from the 1961 Census, the monograph may point up clearly certain limitations in the statistics and some avenues toward improvement in future censuses of Canada.

In order to achieve these purposes, the monograph is arranged into two parts – an entirely descriptive one and a partly analytical one. The entirely descriptive part is comprised of Chapters Two to Four. Chapter Two is largely a historical review of some of the major features of Canadian

migration. It considers the patterns of migration streams and the temporal variation in migration ratios for provincial, urban and rural areas, serving as a background document for the remainder of the monograph. Relying mainly upon the 1961 Census data, Chapter Three describes some of the differentials among demographic and socio-economic groupings of population in regard to migration ratios, as well as selected socio-economic characteristics of migrants. Chapter Four focuses on a major highlight of recent migration trends in Canada – the flows to and from Census Metropolitan Areas. Not only are rates of migration described for the Census Metropolitan Areas but selected educational and occupational characteristics are considered for the migrants to and from these areas. In addition, some aspects of migration within Census Metropolitan Areas are reviewed.

The more analytical part of this volume is comprised of Chapters Five to Eight. Chapter Five continues a long tradition in Canadian research by studying the provincial differentials in migration, focusing upon some economic aspects of these differentials. In recognition of the historic importance of agriculture and rural living in Canada, Chapter Six concentrates upon measures of migration ratios for rural farm areas by province. It interprets the pattern of migration for such areas in terms of changes in the structure of the Canadian economy, and attempts to associate economic indicators with the migration ratios. Urban centres and counties or census divisions are the units of analysis in Chapters Seven and Eight, which attempt to show and interpret systematic association between areal variation in migration ratios and that among a number of economic and social indicators.

Following the concluding remarks, there are several appendices, providing selected detailed tables, background information about the gathering and processing of migration statistics in the 1961 Census, and technical comments on some procedures used in this monograph. Many unpublished tables exist, most of them available at the cost of processing for release; requests concerning these tables should be sent to the author.

1.2 THE IMPORTANCE OF MIGRATION STUDY

Excellent comments on the importance of migration study have already been published (Thomas, 1938; Thomas, 1957; Bogue, Shryock and Hagood, 1957; Bogue, 1959; Kuznets, 1964; and Lee, 1966, among others), and an effort to add to these comments is hardly worth its cost. However, points from these comments are summarized briefly here in order to outline a broad theoretical background for this monograph.

Migration is relevant in many social, economic and political problems of Canada and thus it is not surprising to find a widespread interest in the

movement of the Canadian population among its various regions. Studies of economic growth, population composition and growth, fertility and mortality must frequently take migration into account. Persons and agencies concerned with social welfare have a strong interest in migration, since changes of residence are associated with the incidence of social problems in particular Canadian communities.

Migration is an important symptom of economic and social conditions. It is connected with the changes in economic structure which tend to be concentrated at particular points in the spatial distribution of economic activity. Bogue, 1959, p. 486, notes that "every region and every nation which has undergone extensive industrial development has simultaneously undergone a redistribution of its population". A basic reason for this observation has been given in a classic statement by Kuznets and Thomas, 1957, p. 2:

> ... technological change is usually specific, with differential impact upon sectors of the economy and upon economic opportunities in different parts of the country and, once started, it tends to proceed at a rapid pace. The rapidity and magnitude of the differential impacts that accompany modern economic growth are such that the vital processes of birth and death can play but a minor role in adjusting the distribution of population to economic opportunities in different parts of the country. ... it is migration that must provide the main mechanics of adjustment ... .

In effecting the redistribution of population, migration influences the demographic and socio-economic composition of population in particular regions and thus influences their growth potential and the extent to which they experience certain social and economic problems. Kuznets, 1964, p. xxiii, neatly summarizes the case concerning the relevance of migration in the study of development:

> Internal migration and the redistribution of population by residence among various parts of the country are a major way in which people respond to changing economic opportunities emerging in the course of economic growth. Not all internal migration is in response to economic growth; and not all opportunities emerging in the course of growth require a shift of residence to be converted into realized economic advance. But migration induced by growth that promises greater opportunities has been sufficiently massive in the presently advanced countries to warrant the view that the relation between population redistribution and economic development is an important and indispersable link in the mechanism of modern economic growth.

One aspect of the functions of migration in the mechanism of modern economic growth is its role in bringing about improved spatial allocation of skilled labour. As Bogue, 1959, *The Free Press*, p. 487, notes, "persons who possess or acquire special abilities are not necessarily born or educated at the site where their talents are needed". By effecting the spatial

reallocation of skilled labour, migration contributes to the efficient use of human resources and to increased production from economic activity.

Migration can be a manifestation of and a contributor to major social problems. As Bogue has pointed out, an extended drought or famine, the exhaustion of forest, mineral or agricultural resources; a sequence of unfavourable crop seasons; or continued social or political oppression can lead to large-scale migration from an area to other parts of the nation. Migrants displaced by unfavourable conditions tend to be in need of assistance from the communities through which they pass. At these communities the migrants may create or contribute to social and economic tensions which can become great enough to require action by social welfare agencies and government.

Migration is also an instrument for cultural change and for diffusion of new behaviour patterns and styles of living across several communities. In so functioning it becomes of interest to students of social change in local communities.

In summary, migration is an important component of population change, particularly when viewed from the standpoint of a local community. It is at once an indicator and a generator of social and economic changes, altering the size and the demographic and socio-economic compositions of population. Through such alteration it influences the growth potential of a community and the extent to which the community experiences certain social and economic problems.

1.3 DATA SOURCES AND QUALITY

The migration statistics obtained in the 1961 Census were gathered through a 20 per cent sample of private households drawn in conjunction with the census. The procedures of sample selection, sample data processing and estimation are referred to generally as the "1961 Population Sample" (see Appendix B for some details on the Sample). From the sample estimates various cross-tabulations (mostly unpublished) of population by migration status and other attributes were generated according to specifications prepared by the late Dr. Kasahara. In attempting to complete the migration monograph after her death, the author has worked with the tabulations prepared according to those specifications.

Use is also made of net migration estimates derived by indirect methods (see Appendix C), these estimates requiring the merging of census and vital statistics. Occasionally, other non-census statistics (such as some income data in Chapters Five and Six and the information on road distances to metropolitan centres in Chapter Eight) are used to provide

information needed in the analyses. The major source of data is the 1961 Population Sample.

Essentially, the migration data from the 1961 Population Sample are based upon the responses to a census question which, in effect, compares the respondent's place of residence on June 1, 1956 with that on June 1, 1961. For this reason the data may be said to refer to "five-year migration" (see Appendix B, Section B.2). Through this comparison of residence at two points in time, measures (in regard to five-year migration) may be made of the volumes of in- and out-migration for various areal units — the provinces, urban size groups (100,000 and over, 30,000 - 99,999, 10,000 - 29,999, and under 10,000), rural non-farm and farm within each province, and Census Metropolitan Areas along with their central cities and fringe areas. From these tabulations, in-, out- and net migration ratios may be calculated.

The tabulations also classify the migrant population by type of movement — for example, intra-provincial and inter-provincial migration, movement from contiguous and non-contiguous provinces, movement from rural to rural, rural to urban, urban to rural, and urban to urban, etc. Such movement types are cross-tabulated with age, sex, marital status, schooling, origin, place of birth, labour force status, occupation and income. These cross-tabulations should be interpreted with caution, since the characteristics reported on the census date may not necessarily coincide with those at the time of migration. As indicators of migration differentials in demographic, social and economic characteristics, the results of these tabulations should be considered as approximations only. However, they throw some light on the potential implications of population movement for different parts of the country (see Chapter Three, Section 3.2, and Appendix B for further discussion on this point).

The available relevant information does not permit any comprehensive and concrete evaluation of the quality of the statistics used in this monograph. Appendix Tables B.1 to B.10 indicate much of the relevant data which the author has been able to assemble on this subject. This monograph is based on the principle that some useful information can be gleaned from faulty statistics through the exercise of informed judgement in the analysis of the statistics (see Appendix B, Section B.3 for further comment). The reader, on his part, should approach the statistics cautiously, tending to emphasize the general levels (rather than the exact values) of numbers and differences, and looking for systematic and recurrent patterns. Of course, the general levels and systematic patterns among numbers may be the results of substantial and persistent errors but one is generally less exposed to the distortion of error by emphasizing these aspects of statistics than the exact values of numbers.

1.4 SOME BASIC CONCEPTS

Ideally, a migrant is a person who leaves one community and takes up residence in another. The term "migrant" should indicate a certain amount of pulling up of 'roots' from one socio-cultural milieu and transplanting them in another (cf. Bogue, 1959, p. 489, and Lee, 1966). However, the application of this term in a census poses a formidable problem in the delineation of community boundaries. An admittedly poor solution is to use the boundaries of municipalities, but this is the practical solution. Thus, for this census monograph, a migrant is a person who crosses a municipal boundary in the process of changing residence. The migrants are one sub-group of *movers*; the other movers are those whose residence changes do *not* take them across municipal boundaries. By "mobility" is meant any change of residence, while "migration" refers to those changes of residence that entail the crossing of municipal boundaries. Despite the arbitrary nature of municipal boundaries, the variation among municipal populations (in demographic, social and economic characteristics) is sufficiently strong and systematic to suggest that it is correlated with the variation that might be observed among the populations of more carefully delineated communities.

Two considerations were particularly influential in guiding the choice of the municipality as the smallest areal unit for identification of migrants. It was thought that, among the sub-provincial units, the municipality would be most likely to be accurately remembered by census respondents in reporting their 1956 place of residence. Secondly, it was thought that most moves which involve the transplantation of 'roots' between two distinct communities are likely to be inter-municipal. Of course, a significant portion of inter-municipal moves may not involve such transplantation, but any choice of community boundaries leads to problems in the treatment of those persons who make rather short moves just across the boundary lines.

Given the choice of boundaries for identifying migrants, it is possible to identify two major directions of migration. For a given municipality, the *in-migrants* were comprised by its 1961 (June 1st) residents who resided elsewhere on June 1, 1956; its *out-migrants* were those who resided there on June 1, 1956 but were living elsewhere on June 1, 1961. The algebraic difference (in-migrants minus out-migrants) between the two groups is called *net migration*. The concept of net migration is purely mathematical (there is no net migrant), but it is important as a measure of the shifts in population size and composition resulting directly from in-migration and out-migration. The net migration ratio (net migration divided by population) is a measure of the intensity of such shifts in terms of their impact on population size.

It should always be remembered that the census statistics do not measure the total number of migrations between June 1, 1956 and June 1,

1961. They fail to reflect the relevant data for persons who died after migrating (subsequent to June 1, 1956), for emigrants from Canada, and for the multiple moves of a given individual. For this reason, the term "five-year migration" will be used repeatedly in the text (see Appendix B; Section B.2 for related comments). In her proposal for the migration monograph, the late Dr. Kasahara nicely summarized the conceptual problems associated with the gathering and analysing of the census migration statistics, and this summary is worth substantial quotation:

> Theoretically, migration is defined as a change in one's community membership, involving not only a change in his usual place of residence but also significant alterations in his community ties and life conditions. Intra-community movements which usually entail little or no change in the social milieu are thus regarded as non-migratory, whereas most inter-community movements are migratory. There are, however, a number of borderline cases in which distinction between migratory and non-migratory movements tends to be blurred (e.g., itinerary salesmen, seasonal migratory labour, nomads, etc.). Change in community membership which forms the basis for the above definition, moreover, is almost impossible to measure within the framework of the census.
>
> In the first place, no consensus exists upon the basic criteria for defining a population aggregate as a community. In the second place, measurement of change in one's community membership is extremely difficult even when a specific definition of community is adopted, since a battery of elaborate and detailed rules should be established and applied rigorously to the collection and processing of the data required. For practical purposes it is necessary, for example, to determine clear-cut geographical boundaries which must be crossed before a given movement may be regarded as migration. The geographic boundaries of a "community", however, are not easy to identify, for they seldom coincide with the administrative or legal boundaries of a population settlement. Boundary changes over time, which are implicit in the very concept of community, present a further complication.
>
> In order to minimize such problems of measurement, the 1961 Census adopted the definition of migration as a change in the usual place of residence across municipal boundaries between June 1, 1956 and June 1, 1961. This definition is quite arbitrary — merely a convenient approximation to the theoretical concept based on change in community membership. Although relatively simple and easy to apply, it will put some non-migratory movers in the migrant category, while it will fail to include among migrants some who have actually undergone significant changes in community membership.
>
> Another problem of migration statistics from the 1961 Census is that practically all the characteristics of the population relate to the census date in 1961; hence migration differentials *at the time of movement* are not measurable except in such constant characteristics as the sex. Even the age differentials in migration (measured in terms of age at the 1961 census date) would be subject to the mean error of two to three years with the maximum error up to five years, since migration could have taken place at any point over the

five-year interval. "Migration differentials" as observed at the census date of 1961, therefore, should be examined with caution; they would yield little more than clues to the process of "selection" operating at the time of movement. Any change in social and economic characteristics of migrants as a "cause" of migration cannot be assessed; nor is it possible to detect migration differentials that might emerge as the consequences of change in community membership or of the process of assimilation of migrants into their new environments. A study of motivational factors in migration would also be completely out of the question as far as the census data are concerned. Nor would the census data permit any analysis of qualitative differences between migrant and non-migrant population, if there are any (e.g., intelligence, personality adjustment, etc.).

Thus, limitations imposed by the data themselves will restrict the scope of the study quite severely; many of the gaps in our knowledge of migration in this country will have to remain unfilled. It should also be noted that the paucity of historical data necessitates the adoption of a more exploratory approach in this study than in some other fields of investigation where a considerable body of knowledge has already been accumulated and systematized. The study thus aims primarily at examining and ordering the facts that the available data unfold and suggesting a set of hypotheses to be tested in the future. Although attempts will be made to account for certain significant features of migration in this country, an intensive analysis of the entire story of this complex phenomenon cannot be carried out without more analytical material than is available at present.

1.5 SYNOPSIS OF MAIN FINDINGS AND INTERPRETATIONS

A summary of the main findings should, along with the Table of Contents, provide a comprehensive overview of this work. The following summary should also be helpful to the reader who does not care to wade through the detailed discussion in particular Chapters. Of course a summary cannot recapitulate all the findings and discussions that may be of interest, and therefore it should not be taken as a substitute for the detailed discussion in each Chapter.

1.5.1 EXTERNAL MIGRATION FLOWS PROMINENT IN CANADA'S HISTORY – Canada has had substantial streams of external migration throughout its history. For example, the total number of immigrant arrivals in the 1851-1961 period was more than one third, although less than one half, of the number of births (to which immigrants contribute) in this period. The number of emigrants in the same period was roughly three quarters of the number of immigrants. Thus, the direct contribution of external migration (the difference between the numbers of immigrants and emigrants) was not impressive; however, the indirect contribution from the offspring of immigrants cannot be ignored. The flows of immigration and emigration showed marked patterns of historical variation over the past century. In the period since the beginning of the Second World War, decennial immigration ratios showed an upward

trend while the decennial emigration ratios remained stable near a very low value.

1.5.2 CENSUS STATISTICS SHOW ONTARIO AS PRINCIPAL PROVINCIAL DESTINATION OF INTERCENSAL IMMIGRANTS SINCE 1921 – Since 1921, Ontario was the most favoured province for intercensal immigrants to Canada. However, the Prairie Provinces (all three taken together) had a larger share than Ontario of these immigrants in 1911-21, and probably in 1901-11 as well (data are not available for 1901-11). Since 1921 the other three most favoured provinces were Quebec, Alberta and British Columbia. Very little information is available on the provincial contributions to the volume of emigrants from Canada.

1.5.3 INTERNAL FIVE-YEAR MIGRATION RATIOS HIGHEST FOR THE WESTERN AND MARITIME PROVINCES – The internal migration streams are very much larger than the external ones (immigrants and emigrants). The Canadian population is in a perpetual state of flux as people change residence from one location to another. Among provinces, the largest volumes of migration flow usually have been observed for the provinces with the largest populations (particularly Ontario). However, the migration ratios, calculated to partially eliminate the influence of population size, tend to be highest for the western and Maritime Provinces. The migration ratios suggest that the impact of inter-provincial migration on provincial population size and composition has been highest in these provinces.

1.5.4 FLOWS WITHIN MAJOR EASTERN AND WESTERN HALVES OF CANADA TEND TO DOMINATE THE PATTERN OF INTER-PROVINCIAL MIGRATION STREAMS – Each province sends its out-migrants to several different provinces, depending on their proximity, population sizes and socio-economic attributes. Ontario was clearly the favourite provincial destination for the five-year out-migrants from Quebec and the eastern provinces. Quebec was the most favoured destination for the five-year out-migrants from Ontario. The other five-year out-migrants from Quebec and the eastern provinces remained east of Ontario for the most part. Following Quebec, British Columbia was the most favoured destination for the five-year out-migrants from Ontario. The five-year out-migrants from the western provinces were heavily concentrated among destinations west of Quebec Province. Only for Manitoba was a non-western province (Ontario) the most favoured destination of five-year out-migrants originating in the west. Relative to population size, the inter-provincial migration streams were small; for no stream was the volume as large as two per cent of the average of the sending and receiving populations.

1.5.5 GROSS INTER-PROVINCIAL MIGRATION RATIOS HIGHEST FOR WESTERN AND MARITIME PROVINCES – The rate of population turnover through five-year migration, as reflected by the *gross* migration ratio, was highest in the western and Maritime Provinces. Much lower rates were shown for Newfoundland, Quebec and Ontario, although the absolute sum of in-migrants and out-migrants was highest by far in Ontario.

1.5.6 PROVINCIAL DIFFERENTIALS IN NET INTERNAL MIGRATION – In general, the 1961 Population Sample data indicate systematic, although not large, provincial differentials in the *net inter-provincial* five-year migration. The provinces that enjoyed the highest levels of income, modernization and economic growth in recent decades (Ontario, British Columbia and Alberta) were the only ones sustaining net gains in the 1956 - 61 five-year migration; the provinces that had the highest concentrations of work force in primary activities had the sharpest net losses in the 1956 - 61 five-year migration ratios.

1.5.7 HISTORICALLY PERSISTENT PATTERN OF PROVINCIAL DIFFERENTIALS IN NET INTERCENSAL MIGRATION – A distinct pattern of provincial differentials in net migration ratios may be observed over the decades since 1871. Only Ontario and British Columbia showed any tendency toward consistent net gains through migration, and this tendency was stronger for British Columbia than for Ontario. Since the Second World War, Alberta joined Ontario and British Columbia as the three provinces with substantial net migration gains. Along with the other Prairie Provinces, Alberta had very high net migration ratios in the early decades of the current century and had marked net losses in the relatively depressed 1931 - 41 decade. With the exception of the 1871 - 1901 period, Quebec showed relatively low net migration ratios in the various decades; in the three decades from 1871 to 1901, Quebec sustained substantial net migration losses. A consistent pattern of decennial net migration losses throughout the 1871 - 1961 period was shown by the Maritime region.

1.5.8 IN-MIGRATION RATIOS HIGHEST FOR RURAL NON-FARM AREAS, OUT-MIGRATION RATIOS HIGHEST FOR LOWEST URBAN SIZE GROUPS – Among four selected urban size groups and two rural categories, the 1956 - 61 five-year in-migration ratio was highest for the rural non-farm category and for the 1,000 - 9,999 urban size group; one fifth of the population in these two groups consisted of 1956 - 61 migrants. The five-year out-migration ratio was greatest for the lowest urban size groups (1,000 - 9,999 and 10,000 - 29,999) and for the rural farm population.

1.5.9 THE RELATIVELY LARGE INTERNAL MIGRATION STREAMS WERE INTER-URBAN, NOT RURAL-URBAN — Relative to the size of the urban population, neither the rural-to-urban nor the urban-to-rural five-year migration streams were particularly significant. However, the urban-to-rural streams generated high in-migration ratios for rural non-farm areas, while the rural-to-urban flows involved relatively high out-migration ratios for rural farm areas. Out-migrants from urban areas predominantly chose destinations in other urban areas, and the tendency was evident even after the concentration of the 1956 population in urban areas was taken into account. Among the selected urban size groups, the 100,000 and over group was most favoured as a destination for five-year migrants, even after the concentration of 1956 population in this size group was taken into account.

1.5.10 NEARLY ONE HALF OF THE SAMPLE RESIDED IN A DIFFERENT HOUSE FIVE YEARS BEFORE THE CENSUS — Although this volume is concerned almost entirely with inter-municipal moves, there is some interest in the mobility rates reflecting changes of residence within the same municipality as well as inter-municipal moves. Canada had a high mobility ratio from the 1956-61 five-year moves. Among the reporting population (see Appendix B, Section B.1) in 1961, some 44 per cent lived in a different house five years before. The corresponding ratios for the urban and rural populations were 50 per cent and 30 per cent, respectively. Furthermore, the ratio tended to increase with the size of urban place, as judged by broad urban size-group statistics. Finally, distance impedes mobility (as is well known) for the intra-municipal movers greatly exceeded the intra-provincial (inter-municipal) movers, who in turn greatly exceeded the inter-provincial migrants.

1.5.11 MIGRANTS SHOW A DISTINCTIVE PATTERN OF SOCIAL AND ECONOMIC CHARACTERISTICS — The five-year migration data suggest that migrants form a distinctive segment of the Canadian population in regard to their social and economic characteristics. Among language and religious groups, five-year migration ratios were highest for the English-speaking Protestants and the five-year migrants were most likely to be English-speaking Protestants. The data suggest that the five-year migrants had a heavier weighting among the higher levels of educational attainment and of occupational skill than did the general population of similar age. Relatively low migration ratios were shown for Jewish persons and French-speaking Roman Catholics, among language-religion groups, and by those with elementary education and low-skilled occupation.

1.5.12 CENSUS METROPOLITAN AREAS SHOW HIGH IN-MIGRATION RATIOS, BUT WITH MARKED VARIATION — Taken as a group, the Census Metropolitan Areas (MAs) had a net gain from 1956-61 five-year migration,

while the non-metropolitan areas had a net loss. The differential between these two groups of areas was less sharp in regard to in-migration and out-migration ratios. The in-migration ratios were highest for the MAs of Calgary, Edmonton, London, Ottawa, Kitchener and Halifax. The out-migration ratios were highest (in absolute value) for the MAs of Halifax, Calgary, Edmonton, Sudbury, London and Winnipeg.

1.5.13 A DISPROPORTIONATELY LARGE SHARE OF THE FIVE-YEAR MIGRANTS TO A GIVEN MA CAME FROM NON-METROPOLITAN URBAN AREAS – For each MA, slightly less than one half of the five-year in-migrants came from urban areas outside of other MAs, while only one fourth of the 1956 population (residing outside the relevant MA) resided in such urban areas. This finding probably reflects the relatively longer distances among MAs, so that the attraction of a given MA upon the potential in-migrants was more effective when exerted upon the nearer non-MA areas than upon other MAs.

The MAs having the largest percentages of in-migrants coming from other MAs are located in Ontario and British Columbia (Victoria, Hamilton, Toronto, Ottawa, Windsor, London, Vancouver and Kitchener). The MAs having higher-than-average distances to their nearest MA-neighbours tend to show the low values on the percentage of in-migrants who resided in other MAs in 1956. The MAs with the highest percentages of in-migrants who resided in rural areas in 1956 were Winnipeg, St. John's, Saint John, Quebec, Edmonton and Halifax.

1.5.14 HIGHER-THAN-AVERAGE LEVELS OF EDUCATION AND OCCUPATIONAL SKILL SHOWN FOR THE STREAMS INVOLVING MAs – The five-year migrants to MAs had higher levels of education than the non-migrant residents of the MAs, in similar sex and age groups. The relatively high mean level of education among the in-migrants to the 1961 MAs (as compared with the five-year non-migrants) is largely accounted for by the in-migrants from *other* MAs. The in-migrants from *other* MAs had considerably higher levels of education than did the in-migrants from non-MA areas.

Roughly similar educational distributions are shown by the in-migrants to MAs coming from non-MA areas and by the out-migrants from MAs going to non-MA areas. The mean level of educational attainment was just slightly higher among those leaving MAs (for non-MA residence) than for those entering MAs (from non-MA residence). In turn, the latter group was also better educated by 1961 than were the migrants between non-MA areas.

Thus, the following four migration streams are ranked from highest to lowest in regard to the mean level of educational attainment: (1) inter-MA migrants, (2) MA-to-non-MA migrants, (3) non-MA-to-MA migrants, and (4)

inter-non-MA migrants. This rank ordering may not be surprising when consideration is taken of the relatively long distances separating MAs, and the concentration in MAs of higher education facilities and of jobs requiring higher-level skills.

The per cent of the male labour force in professional occupations was higher for the in-migrants to MAs than for the whole labour force of the MAs. This statement held true in each of three selected age groups. As with education, the differential between the in-migrants and the total male labour force in the per cent of professionals was much more due to the in-migrants from other MAs than to in-migrants from non-MA areas. In each of the selected age groups the percentage in the professional occupation group was markedly higher among the in-migrants from other MAs than among the in-migrants from non-MA areas. For example, among the highly mobile males aged 25 - 34 (as of 1961), the per cent of professionals among in-migrants to MAs was almost ten points higher for those coming from other MAs than for those coming from non-MA areas.

Thus, selecting the MAs, other urban and other rural areas as three broad nodes for migration streams, it is found that the greatest concentration in higher levels of education and occupational skills is observed in the inter-metropolitan streams. This tendency is sharp and systematic over various age groups of the male labour force. In addition, the other streams in which MAs form either origins or destinations have much larger concentrations of the higher levels of education and occupational skills than the streams among non-metropolitan origins and destinations. The streams involving MAs (at origin or at destination) are the largest in volume among the three broad nodes. Therefore, it is clear that the migrants with higher level education and skills move primarily among MAs and, secondarily, between MAs and non-MA areas. The major sources of such migrants to non-MA areas are the MAs, and the major destinations of such migrants from non-MA areas are again the MAs. In short, the MAs are of immense importance among nodes in the internal migration of persons at the higher educational and occupational skill levels.

1.5.15 LARGE INTRA-METROPOLITAN POPULATION REDISTRIBUTION AT THE EXPENSE OF THE INCORPORATED CENTRAL CITIES – Both central city and MA ‘ring’ had substantial rates of in-migration from outside the MA, but the central city had much higher relative out-migration losses (to areas *beyond* the MA boundaries) than did the ring. Thus, the result of the migration into and out of the MA was a net loss to the central city and a net gain to the ring. This differential in net migration showed up even more sharply in the *intra*-metropolitan migration.

The data permit for the first time a breakdown of the well-known central city-ring differentials in net migration, at least for the 1956-61 period. Both the central cities and the MA rings tended to have substantial in-migration ratios for persons coming from outside the MAs, but the central cities failed to have significant in-migration ratios among the *intra*-metropolitan migrants. That is, the stream of migrants from the ring of an MA to the central city of an MA was very weak relative to the size of the central city population. Thus, the in-migrants to the central city were mostly persons coming from outside the MA. The ring, on the other hand, had significant in-migration ratios *both* from outside the MA and from the central city of the same MA. As regards out-migration to destinations outside the MA, the central city was the major contributor.

1.5.16 SOCIO-ECONOMIC DIFFERENTIALS BETWEEN CENTRAL INCORPORATED CITY AND MA RING AFFECTED BY POPULATION REDISTRIBUTION – The intra-metropolitan redistribution of population generated by the 1956-61 five-year migration affected the differences between central city and ring in population composition as well as in size. The impact on population composition involved social and economic as well as demographic factors. Generally, the net effect of this redistribution was to raise the levels of education and occupational skills in the ring and to lower it in the central city. As regards demographic differentials, the redistribution tended to increase the proportion of married persons in the ring while lowering it in the central city.

1.5.17 DIFFERENTIALS AMONG MAJOR REGIONS IN DECENNIAL NET MIGRATION CLOSELY ASSOCIATED WITH THE VARIATION IN REGIONAL INCOME[2] – In a review of the pattern of decennial net migration ratios for provinces and major regions, it is found that regional net migration in Canada has generally been closely related to the relative levels of regional income, so that in a rough way it is easy to find support for an economic interpretation of regional migration. A concise way to consider the relationships between regional net migration and levels of income per capita is through the rank correlations of the two. In the various decades relatively high Spearman rank correlation coefficients are observed between provincial net migration of males 20-44 years of age and levels of participation income per capita. The only exception to that generalization is the decade of the 1930s.

Another indicator of economic opportunities is the extent of structural change that a region is undergoing, particularly the shift of workers from predominantly rural occupations, such as farming and fishing, to predominantly urban occupations. The marked shift of workers out of rural occupations, or 'agriculture', into 'industrial' occupations is widely agreed to be

one of the prominent features of economic development. Except during the early period of western settlement, the extent of the shift of workers from agriculture to industrial occupations might be taken as an indicator of changing economic opportunities.

The use of 'industrialization' as a measure of economic opportunity might take either of two forms. The best opportunities may be expected to lie in those regions that, at the beginning of the decade under consideration, have the highest proportions of their workers in non-agricultural occupations. Alternatively, one might expect the rate of growth of employment in non-agricultural occupations over the course of the decade to be a better indicator. Both measures of industrialization have a weaker association with net migration than do relative levels of income; and it is only after the period of settlement that relationships are obtained between migration and industrialization that come anywhere near being significant. In the early period it is known that the attractive opportunities lay in the western provinces which were predominantly agricultural, and in agriculture itself. In only two decades, 1931-41 and 1941-51, was migration fairly strongly correlated with the proportion of the work force in non-agricultural occupations at the beginning of the decade.

1.5.18 A MEASURE OF THE PRESSURE OF NATURAL INCREASE UPON LABOUR SUPPLY IS ASSOCIATED WITH PROVINCIAL LEVELS OF NET MIGRATION — It is widely recognized that there have been pronounced differences among Canadian provinces in rates of natural increase of population. These probably entail varying degrees of pressure on labour supply among the provinces, and it would seem that in Canada regional differences in the pressure of labour supply provide a useful supplement to income differentials in an explanation of migration. Economic opportunities in one province may be less promising than elsewhere because of past population increases and greater competition in the labour market from new entrants. Moreover, the extent of this sort of population pressure may have varied over time in the several provinces so that the effects of labour supply may have varied from decade to decade. An indicator of prospective pressure from new entrants into the labour market would be the ratio of males 10-19 years of age to total male workers at the beginning of the decade. These ratios for Canadian provinces show a marked degree of variation. Even otherwise rather similar provinces have substantial differences in the relative magnitudes of the potential increase in the supply of labour. In 1951, for example, the ratio for Saskatchewan was at least nine per cent above that of either Alberta or Manitoba.

In half of the decades under consideration the negative rank correlation between this ratio and provincial net migration rates was significant. In one

other decade (1941 - 51) the correlation fell only slightly short of such significance. Of the two decades for which there was no significant correlation, one was the first decade of the century when the locations of demands for labour were changing so dramatically that the influence of any supply variable would surely have been swamped. The other decade was 1931 - 41, the depression decade for which neither income differentials nor labour supply provides a good explanation of the pattern of migration.

1.5.19 NET INTERCHANGES OF 1956 - 61 FIVE-YEAR MIGRANTS AMONG PAIRS OF PROVINCES ARE SYSTEMATICALLY ACCOUNTED FOR IN A REGRESSION ANALYSIS – Seven explanatory variables reflecting factors such as income, unemployment, population size, distance, and information flows account for more than 80 per cent of the variance in the *net* interchange of five-year migrants among 21 pairs of major regions. Among the seven variables, those indicating income, information flows and distance were the most important in this finding.

1.5.20 FOR MALES IN FOUR SELECTED AGE GROUPS, THE REGRESSION MODEL WORKS BEST WITH THOSE AGED 35 AND OVER – Reasonably strong confirmation of the regression model is observed for males in the 35-and-over age group (as of 1961). The poorest 'fits' were obtained for the age group 25 - 34, which includes the peak ages of migration. These results may reflect substantial errors in the basic statistics (particularly in view of the small sample sizes in several of the cells of the inter-provincial migration matrix) but, if fairly accurate, they would indicate a need for a re-thinking on the kinds of models needed to account for the migration of the important 25 - 34 age group.

1.5.21 RESPONSE OF MIGRATION TO REGIONAL EARNINGS DIFFERENTIALS VARIES SYSTEMATICALLY WITH AGE – The net migration (between pairs of major regions) data suggest that, moving from the younger to the older age groups, there is a decreasing response of migration to a given earnings differential between the two relevant regions. A decreasing response by age is also observed with the lengthening of the distance between the two regions.

1.5.22 THE ECONOMIC MODEL APPEARS TO WORK DIFFERENTLY AMONG WORKERS WITH DIFFERENT AGE AND EDUCATIONAL ATTAINMENT – The economic model appears to provide a much better explanation of the migration of persons with only elementary school education than it does of persons with secondary schooling. The close fit for males aged 35 and over with elementary schooling is striking. The very simple model that is used accounts for a large proportion of the variation in migration. The deterrent effect of distance is high and the reaction to earnings differentials

is fairly strong. On the other hand, the migration of the same age group with secondary schooling is very weakly related to differential wage earnings. The regression coefficient for the earnings variable is of doubtful significance. Distance performs a little better than this variable and appears to constitute less of a deterrent for the better educated than for those with only elementary school education. But for the group with secondary schooling the model accounts for a very much smaller share of over-all variation.

1.5.23 **THE MIGRATION EXPERIENCE OF RURAL FARM AREAS REFLECTS STRUCTURAL CHANGES IN THE ECONOMY** – Rural farm migration flows may be regarded as part of the process of growth and structural change in the economy, a process that occurs as variations in the rate of growth of demand for the outputs of different sectors in the economy create sectoral variations in levels of income and economic opportunity. The rural farm population responds to increased incomes and opportunities in the non-farm areas by relocating to non-farm areas; however, provincial variations in the magnitude of the response appear to depend partly on socio-cultural and demographic factors. In the 1956-61 period, rural farm areas sustained substantial net migration losses due to high rates of out-migration and to low rates of in-migration.

1.5.24 **HIGH LEVELS OF NET MIGRATION LOSSES ARE SHOWN FOR RURAL FARM AREAS IN THE 1956-61 INTERNAL MIGRATION** – High net migration losses (relative to the rural farm population size) were sustained by rural farm areas in the various provinces, particularly British Columbia, Nova Scotia and New Brunswick. Underlying the pattern of net losses are high out-migration ratios and low in-migration ratios for the rural farm areas. Expressed as a percentage of the 1956 farm population, the intra-provincial out-migration from rural farm areas exceeded 10 per cent in British Columbia, Nova Scotia, Ontario and New Brunswick and was close to 10 per cent in Quebec, Manitoba, Saskatchewan and Alberta. The highest five-year in-migration ratios to rural farm areas were shown by British Columbia, Ontario and Alberta.

1.5.25 **OUT-MIGRANTS FROM RURAL FARM AREAS SHOW HIGHER SCHOOLING LEVELS THAN THE REMAINING RURAL FARM POPULATION** – Out-migrants from rural farm areas were generally better educated by 1961 than the residents of rural farm areas in similar sex and age groups. This differential appears more sharply among the inter-provincial than among the intra-provincial migrants. Compared with the 1961 non-farm population, inter-provincial out-migrants from rural farm areas had higher levels of education while the intra-provincial out-migrants from rural farm areas had lower levels of education.

1.5.26 OCCUPATIONAL SELECTIVITY AMONG MALE OUT-MIGRANTS FROM RURAL FARM AREAS VARIES BETWEEN INTER-PROVINCIAL AND INTRA-PROVINCIAL MIGRANTS – In terms of the occupations reported for 1961, the male inter-provincial out-migrants from rural farm areas tended to be concentrated in particular occupation groups to a greater extent than the intra-provincial out-migrants. The former set of rural farm out-migrants tended to be more heavily concentrated among professional, technical, service and recreation occupations than was the whole male labour force in the areas of destination (non-farm areas). In comparison with this labour force, the male intra-provincial out-migrants from rural farm areas tended to show a higher concentration in 'blue collar' occupations. This differential partly reflects the finding that the male inter-provincial rural farm migrants were generally more highly educated and younger than their intra-provincial counterparts.

1.5.27 THE 1956-61 RURAL FARM MIGRATION RATIOS ARE ROUGHLY ASSOCIATED WITH PROVINCIAL LEVELS OF PER CAPITA INCOME – Using average figures for groups of provinces, some associations with the provincial levels of per capita income are observed for the rural farm migration ratios but the pattern of association varies among migration streams according to their types and directions. Generally, the rural farm in-migration ratios vary positively with the provincial agricultural income per capita. The level of non-agricultural income at the non-farm destination varies positively with the *inter*-provincial migration from rural farm areas. The intra-provincial out-migration fails to show a similar pattern of association, suggesting a decrease in the importance of income benefit factors as migration distance decreases.

1.5.28 FIVE-YEAR IN-MIGRATION RATIOS ARE SYSTEMATICALLY ASSOCIATED WITH A NETWORK OF ECONOMIC AND SOCIAL INDICATORS FOR URBAN COMPLEXES – Using selected attributes of urban complexes[3] in 1961, a systematic pattern of association is found between a number of economic and social indicators (taken simultaneously) and the 1956-61 in-migration ratio. This association is consistent with the expectation that the inter-urban differentials in in-migration rates are connected with those in economic and social factors. Indicators reflecting modernity of economic structure and income are important in accounting for the association among the MAs and MUAs, while indicators reflecting specialization in tertiary industries[4] and the intensity of trading activity[4] are the prominent ones among the remaining urban complexes.

1.5.29 AMONG URBAN COMPLEXES AND COUNTIES OR CENSUS DIVISIONS, 1951-61 NET MIGRATION RATIOS ARE SYSTEMATICALLY ASSOCIATED WITH MEASURES OF ECONOMIC AND SOCIAL FACTORS AT

THE BEGINNING OF THIS DECADE – A complex of social and economic factors reflecting 1951 levels and 1941-51 changes is systematically correlated with the net migration ratio in the *following* decade (1951-61). The degree of multiple correlation is moderately high, particularly among the counties or census divisions.

In statistical contribution to this correlation, apparently economic factors were particularly prominent and the findings suggest the following interpretative hypotheses. Over the 1941-51 decade, Canada underwent rapid structural changes highlighted by the decline of primary activities and the growth of manufacturing, sales and services. The rapidly growing economic sectors were spatially concentrated in certain regions of Canada and these regions thus had unusually large increases in the economic opportunities that attract migrants. These regions would be most effective in attracting and retaining migrants in the 1951-61 decade, barring strong counteracting forces. These forces did not develop because the 1951-61 decade saw a continuation of the basic economic trends of the 1941-51 period. Among the counties or census divisions, the major relevant shifts probably involved the decline of agriculture and advances in urbanization, manufacturing and and tertiary activity. In regard to the urban complexes, the major relevant shifts probably involved the degree of increase in the performance of metropolitan functions, which spurred the demand for a more highly educated and professional work force and pushed specialization in activities like wholesale trade, business and financial services.

The findings summarized above should serve to indicate the usefulness of the census statistics as sources of information about the flows of population among the various regions of Canada. These statistics serve to document the significant associations between the migration experience of a Canadian community and its socio-economic conditions, and indicate that a comparison of migration rates for Canadian regions usefully reflects their relative economic experiences. The census statistics are clearly one type of migration data, and a thorough study of this subject requires resort to other types as well. It is hoped that the following discussion will contribute to the background of basic information needed to design such a study.

FOOTNOTES TO CHAPTER ONE

[1] This volume is being prepared by Dr. M. V. George of the Census Division, DBS.

[2] The material in Sections 1.5.17 to 1.5.24 is drawn, often verbatim, from the texts of Chapters Five and Six which are under the authorship of McInnis and Curtis, respectively.

[3] An urban complex is a Census Metropolitan Area, or a Census Major Urban Area, or an incorporated urban centre (outside of the MAs or MUAs). In this analysis, only urban complexes of at least 10,000 in population are considered. For discussion of the relevant census definitions, see 1961 Census, DBS 99-512, pp. 2-1 — 2-3.

[4] For clarification, see Appendix E, Section E.2.

Chapter Two

SOME DIMENSIONS OF CANADIAN MIGRATION SINCE THE SEVENTEENTH CENTURY

Migration is one of the most important topics in the study of any society. The pattern of the movement of people over space and among time periods provides useful reflections of economic and social conditions and changes. Perpetual migrational flows of people seem to be characteristic of the history of Canada. These flows show distinct patterns in their regional distribution, in their trends and fluctuations over historical periods, and in the characteristics of persons most likely to be migrants. This Chapter provides a brief review of some of these major patterns in Canadian migration and serves as an introduction to the more detailed discussions in the following Chapters.

Human migration is a prominent feature of history. It would appear that human populations persist in being footloose, as they persist in having children, and Canada is no exception to this tendency. This perpetual migration occurs as individual response to changes in the life cycle,[1] or in individual efforts to maintain or improve the standard of living, to find a more congenial social or physical milieu, or simply to satisfy a desire for a change of scene. In the process of migration, people form streams of migration – a stream being a group of migrants who share common areas of origin and destination. The pattern of the various streams reflects differences among the population centres (the origins and destinations) in regard to those attributes of areas that influence migration decisions; this pattern is a definite clue to some of the spatial aspects of a country's economy, social structure and demographic structure. The migration streams also generate net shifts in population (inflows minus outflows) at each locality, and these net shifts are important in the demographic and economic growth prospects of the locality.

The following Sections contain a historical review of some of the major Canadian migration streams and of the net population shifts they

generated. In conducting this review it is a practical necessity to confine the choice of areal units to those for which census statistics are usually tabulated. Although these areal units are far from ideal, they do reflect social economic and demographic differentials of some substantive interest. The areal units chosen are mainly Canada as a whole, provinces, counties or census divisions, urban centres (as delineated by DBS for the 1961 Census), and Census Metropolitan Areas.

2.1 EXTERNAL FLOWS FOR CANADA

2.1.1 HISTORICAL PATTERN – Prominent among migration streams in Canada's history are those that have flowed into and out of the country. Indeed 'openness'[2] to international migration, viewed in the context of the past three centuries, is one of the important facts of Canada's history.

The population of Canada grew from a few thousand in 1666 to over 18,000,000 in 1961. In almost every decade of this period Canada was entered by immigrants and left by emigrants.[3] Official immigration statistics indicate that more than 8,000,000 immigrants came to Canada in the 110 years from 1851 to 1961 and in the same period more than 6,000,000 emigrants were estimated to have left Canada (Camu, Weeks and Sametz, 1964, Table 3.1). The number of immigrants entering Canada was more than one third the number of births in Canada over the 1851 - 1961 period (Camu, Weeks and Sametz, 1964, Table 3.1); this number of births, about 24,000,000, included births contributed by immigrants. Although the vast majority of these immigrants were natives of the British Isles and Europe, Canada received only a small share of the total number of emigrants from Europe over the 1851 - 1961 period (Camu, Weeks and Sametz, 1964, p. 58), the remainder going mainly to other parts of the Western Hemisphere, particularly to the United States.

The direct contribution of external migration (all immigrants minus all emigrants) to the growth of the Canadian population has been relatively small due to the large number of persons who have left Canada during the past century. It seems that a major portion of these emigrants were former immigrants (cf. Camu, Weeks and Sametz, 1964, p. 58; Hurd, 1943, p. 6). As late as the 1951 - 61 decade, for example, over 70 per cent of the estimated emigrants (who did not return within the decade) from Canada were persons born outside of Canada (Camu, Weeks and Sametz, 1964, p. 58).

Over the course of the twentieth century, emigration of native Canadians has shown a downward trend, both in its absolute volume and its size relative to the Canadian population. In the past three decades, the Canadian-born population of the United States, by far the main destination of the

Canadian emigrants, has declined steadily (Camu, Weeks and Sametz, 1964, p. 58). Using Canadian and United States census data, Buckley, 1963, p. 21, has estimated that around 1871 the United States contained over 80 per cent of the Canadians residing outside their province of birth. By 1961 this percentage had fallen to a figure of slightly more than 30 per cent.

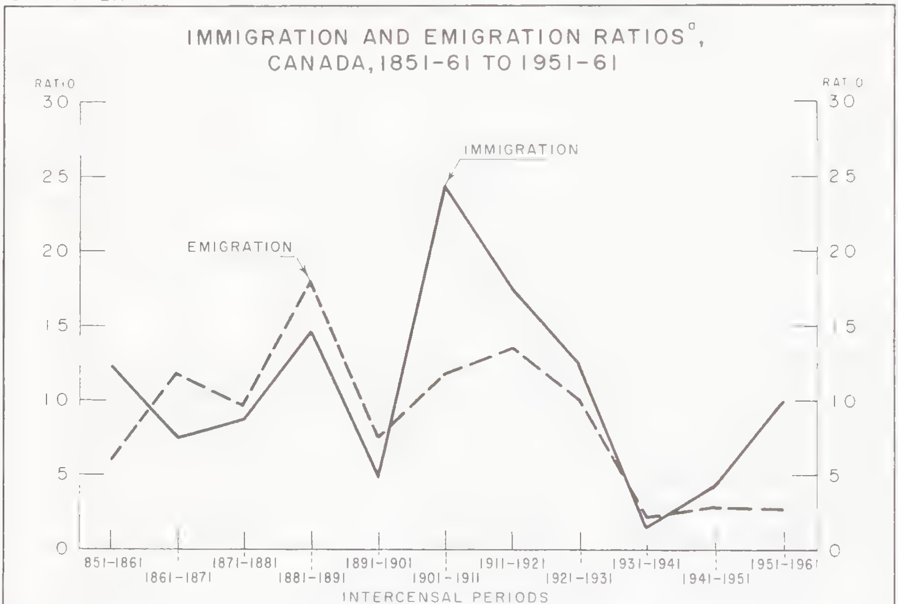
Marked historical fluctuations have been shown by Canadian immigration and emigration; it seems that the flows into and out of Canada have been characterized by prominent waves over time. Up to the middle of the nineteenth century, three major immigration waves may be identified. The first took place in the latter part of the seventeenth century, providing a few thousand additions to a very small population. The second wave was mainly that of the Loyalist immigration about 1783, which was focused upon the Maritimes, the Eastern Townships and Upper Canada. The third major immigration wave in the first half of the nineteenth century followed the economic contraction in Europe which was highlighted by the Irish potato famine. This wave lasted to the early 1850s (cf. Camu, Weeks and Sametz, 1964, pp. 56 - 57).

For the period since 1851, decennial data on immigration have been provided by Camu, Weeks and Sametz 1964, Table 3.1, based largely on official immigration statistics. Chart 2.1 shows these data as immigration ratios (for each decade the immigration is divided by the mean of the initial and terminal populations). The immigration ratios reached their highest peak of 25 per cent in the 1901 - 11 decade, the most prominent intercensal period in the settlement of Western Canada. Before that decade the immigration ratios exceeded 10 per cent in 1851 - 61 and 1881 - 91 only, and since that decade this figure was surpassed in 1911 - 21 and 1921 - 31 only. From its lowest point (since 1851) of one per cent in 1931 - 41 the immigration ratio showed an upward trend to 1961. Despite the well-known upsurge of immigration to Canada in the 1950s, the immigration ratio for 1951 - 61 was less than those shown in five of the other 10 decades since 1851.

The estimates of emigration ratios (Chart 2.1), which reflect mainly the emigrants who did not return to Canada *within* a given decade, also show marked fluctuations since 1851 - 61. On the whole, the fluctuations in immigration and in emigration ratios both reflect rough similarities in historical timing between immigration and emigration waves. There are two marked divergences from a pattern of similarity in the timing of the decennial immigration and emigration ratios (Chart 2.1). Twice since 1851 - 61 a peak in the emigration ratio lagged one decade behind a peak in the immigration ratio (see the immigration ratio peaks of 1851 - 61 and 1901 - 11). The second divergence is that between the stability of the intercensal emigration ratio (near three per cent) in the past three decades and the upward

trend of the immigration ratio since 1931 - 41. It should be noted that these divergences may be distorted to an unknown degree by the fact that the emigration series (unlike the immigration series) does not include the emigrants who leave and return to Canada *within* a given decade, whereas the immigration series measures all immigrant arrivals within each decade.

CHART-2.1



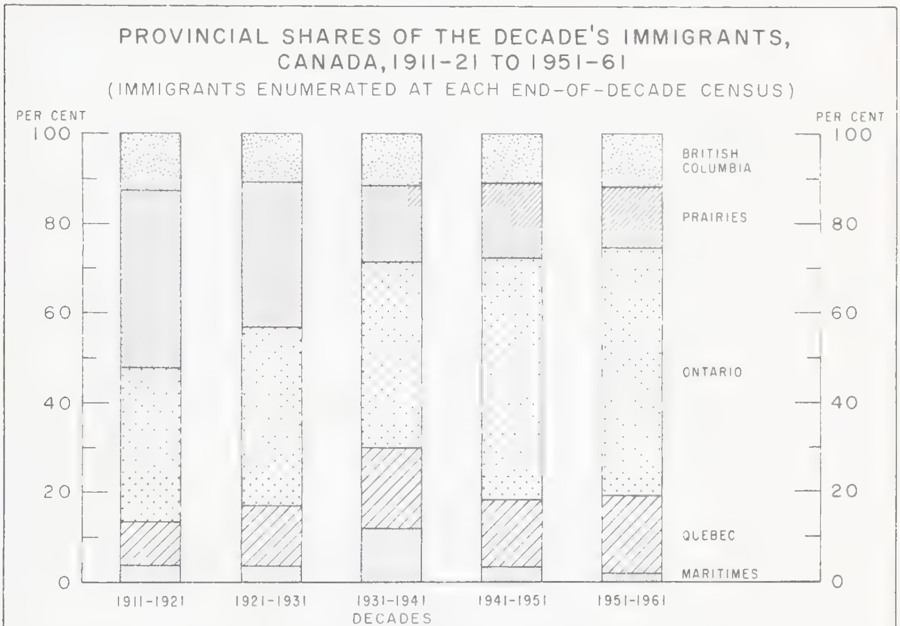
[a] Ratio is 100 times intercensal immigration (emigration) divided by the mean of the beginning-of-decade and end-of-decade populations.

Source: Camu, Weeks and Sametz, 1964, Table 3.1.

In sum, Canada has had substantial streams of external migration throughout its history. For example, the total number of immigrant arrivals in the 1851 - 1961 period was more than one third, although less than one half, the number of births (to which immigrants contributed) in this period. The number of emigrants in the same period was roughly three quarters of the number of immigrants. Thus, the direct contribution of external migration (the difference between the numbers of immigrants and emigrants) was not impressive (cf. Keyfitz, 1950; and Ryder, 1954); however, the indirect contribution from the offspring of immigrants cannot be ignored. The flows of immigration and emigration showed marked patterns of historical variation over the past century. In the period since the beginning of the Second World War decennial immigration ratios showed an upward trend while the decennial emigration ratios remained stable near a very low value.

2.1.2 PROVINCIAL CONCENTRATION OF EXTERNAL FLOWS – It is worth noting that immigration to Canada is composed of several sub-streams of immigration from different countries into the individual provinces. Similarly, emigration from Canada is comprised of sub-streams from individual provinces into different countries (the United States mainly). Relatively little is known about the patterns of these various specific streams of external migration flows.

CHART-2.2



Sources: 1921 Census, Vol II, Table 61; 1931 Census, Vol. III, Table 39; 1941 Census, Vol IV, Table 26; 1951 Census, Vol I, Table 50; 1961 Census, DBS 92-562.

A partially adequate decennial time series on the provincial distribution of intercensal immigrants is available from census statistics. Each census since 1921 has yielded data on immigrants (by province) according to their period of immigration, although these data are affected by the intercensal deaths and emigration of the immigrants. Without independent investigation, these data (Chart 2.2) should be treated cautiously when they are taken as reflections of the relative importance of each province as a destination for immigrants. Chart 2.2 does suggest that since 1921 Ontario has consistently been the principal provincial destination of intercensal immigrants; the percentages shown for Ontario are so large that this suggestion may be taken as being consistent with the facts. In 1911-21, and most

probably in 1901-11 as well, the other major provincial destinations for immigrants were in Western Canada. Taken together, the three Prairie Provinces had a larger share of the 1911-21 immigrants than did Ontario. Since 1921-31 Quebec has become one of the top four provinces in regard to share of immigrants during the 10 years preceding each census, the other three being Ontario, Alberta and British Columbia. The high percentages shown for these four provinces may partly reflect their relatively large shares of Canada's population but it should be noted that both the provincial shares of Canada's population and of the immigrants (of the past 10 years) may be interrelated with the provincial distribution of economic opportunity.

Very little information is available on the relative contributions of the provinces to emigration from Canada. Sinclair (1966, p. 67) has reproduced some 1880 United States data on the province of birth of Canadians residing there and has discussed some relevant implications of more recent data on the languages spoken by Canadians residing in the United States but these data provide only a minute part of the needed information on the provincial origins of Canadian emigrants. Lacking almost all of the needed information, a rough guess may be made of the most prominent provinces in the recent emigration flows. This guess is based on the tendency for the volumes of in-migration or of out-migration (but *not* the net migration) to be positively correlated with the size of population in the relevant area. The observation of this tendency prompts the hypothesis that there is a positive correlation between (*a*) the provincial distribution of immigrants and (*b*) that of emigrants. The product-moment correlation between (*a*) the provincial distribution of immigrants over the 1951-61 decade (as reflected in census statistics) and (*b*) the 1951 provincial distribution of population is 0.88. Similar correlations are observed for the two preceding decades: 0.85 in 1941-51 and 0.92 in 1931-41. Thus it may be suggested that the rank ordering of provinces in regard to the concentration of immigrants is positively correlated with their rank ordering in regard to the share of emigrants, and the favourite provincial destinations of immigrants probably have tended to be the major provincial origins of emigrants. As noted above, the favourite destinations of immigrants in the past three decades were Ontario, Quebec, British Columbia and Alberta, in that order from first to fourth.

2.2 INTER-PROVINCIAL MIGRATION

2.2.1 VOLUMES OF INTER-PROVINCIAL FLOWS – Interesting and important as the external migration streams may be, they are dwarfed in volume by the migration streams flowing *within* Canada. The Canadian population is in a perpetual state of flux from migration as people change residence from one locality to another. Unfortunately, only two censuses (1941 and 1961)

provided data on the separate inflows and outflows of the population for particular population centres or regions. Thus the use of census data for the description of such flows must rely on these two censuses and, appropriately, this monograph gives the greater emphasis to the more recent 1961 Census.

The gross[4] 1956 - 61 inter-provincial migration for a given province was markedly associated with the size of the population of the province (Table 2.1, columns A, G and H).[5] Ontario, Quebec, Alberta and British Columbia had the highest numbers of inter-provincial migrants, and these were the only provinces with over 1,000,000 persons in the reporting population. However, size of provincial population is but a part of the explanation of variation in the volume of inter-provincial migration because the figure for Quebec is only slightly above those for Alberta and British Columbia, whereas the reporting population of Quebec was at least three times as large as either that of Alberta or that of British Columbia (Table 2.1).

The sheer size of population in a province exerts some influence on the number of migrants it receives or the number of its out-migrants. Each group of households within a province has contacts with persons outside the province, and through these contacts flows information about opportunities within the province. The larger the number of households (which is highly correlated with the total population size) in the province the larger, as a general tendency, is the number of contacts with persons outside the province. The larger this number of extra-province contacts the greater is the probability that persons will move into the province, barring offsetting factors. As the number of persons moving into the province increases so does the number moving out; because migration tends to be very heavily concentrated in a relatively small segment of population (cf. Goldstein 1964). Furthermore, as the province's population increases so does the number of moves beginning within the province. As this number of moves increases so does the number that will incidentally cross the provincial boundary. Thus, for the total in-migration and the total out-migration, size of population exerts some influence upon the number of migrants. Of course, there are other sources of influence upon the gross inter-provincial migration (some of which are also affected by size), and some reinforce the independent influence of population size while others counteract it. The net result of all the underlying factors is the actual number of inter-provincial migrants; it is usually difficult to convincingly unravel the separate contributions of the various factors, particularly with data gathered after the fact of migration.

The influence of population size upon the *gross* inter-provincial migration may be partially eliminated by using a ratio whose numerator is the

Table 2.1 – Inter-provincial Five-Year[a] Migration Ratios, Canada, 1956-61

Province	1961 reporting population[b]	In-migration ratio[c]	Out-migration ratio[c]	Net migration ratio[c]: 1961 age five and over	Net migration ratio[c]: 1961 age 20-34	Gross migration ratio[d]	Per cent of in-migrants	Per cent of out-migrants
	A	B	C	D	E	F	G	H
	'000							
Canada[e]	**14,778**	**3.5**	**3.5**	–	–	**7.0**	**100.0**	**100.0**
Newfoundland	375	1.6	2.8	– 1.2	– 3.1	4.4	1.2	2.1
Prince Edward Island	87	5.6	6.8	– 1.3	– 4.6	12.4	1.0	1.2
Nova Scotia	607	4.1	6.5	– 2.5	– 6.0	10.6	4.9	7.8
New Brunswick	492	4.9	5.9	– 1.1	– 3.6	10.9	4.7	5.7
Quebec	4,288	1.6	1.7	– 0.2	– 0.1	3.3	12.9	14.4
Ontario	5,040	3.0	2.3	0.7	1.2	5.3	29.2	22.4
Manitoba	753	5.5	7.4	– 2.1	– 3.2	12.9	8.0	11.1
Saskatchewan	767	4.2	8.2	– 4.4	– 7.7	12.5	6.3	12.8
Alberta	1,059	7.5	6.0	1.6	4.4	13.5	15.3	12.1
British Columbia	1,309	6.7	4.2	2.5	3.0	11.0	16.7	10.5

[a] See Appendix B, Section B.2, for explanation of the term "five-year migration". This note applies to all tables using this term and will henceforth not be re-stated.

[b] The reporting population is the 1961 Population Sample estimate of the residents of private households and aged five and over in 1961, subject to the bias arising from non-respondents in the Population Sample. These figures, however, exclude the estimated number of migrants from abroad.

[c] See Chapter One, Section 1.4, for explanation of the concepts of in-migration, out-migration and net migration. The in-migration ratio is defined as 100 (in-migration/reporting population). The out-migration ratio is defined as 100 (out-migration/exposed population). The net migration ratio is defined as 100 (net migration/reporting population). For explanation of the concept of reporting population see footnote [b]. The 'exposed' population is equal to reporting population *minus* net-migration, and it has the effects of subtracting out from the reporting population the surviving in-migration and of adding the surviving out-migrants back into the reporting population. Thus the exposed population is an approximation to the true 1956 population exposed to out-migration, with the error of approximation involving mainly dead out-migrants and emigrants from Canada, among others. From these definitions it should be clear that the net migration ratio is *not*, in general, equal to the difference between the in- and the out-migration ratios.

[d] The gross migration ratio is defined as 100 (in-migrants *plus* out-migrants/average of the reporting and the 'exposed' populations), and is an indicator of the rate of population turnover in five-year migration.

[e] Exclusive of the Yukon and Northwest Territories.

SOURCE: 1961 Census, DBS 98-509, Tables I-1 and I-3.

volume of gross migration and whose denominator is population size. A markedly different rank ordering of the provinces emerges with the gross migration ratio than that observed above with the volume of gross migration. Ontario and Quebec no longer stand at the head of the list (Table 2.1, column F) but, instead, rank almost at the bottom on the gross migration ratio.

Although Ontario and Quebec had the largest volumes of inter-provincial migrants, these volumes had comparatively low impact on their total populations. The Prairie Provinces and Prince Edward Island showed the highest gross inter-provincial five-year migration ratios for the 1956-61 period. Among these four provinces the gross migration ratio exceeded 12 per cent; among the remaining Maritime and western provinces it was 11 per cent and in the three remaining provinces of Newfoundland, Quebec and Ontario it was close to four per cent (Table 2.1).

The gross inter-provincial migration ratio expresses the turnover of population through inter-provincial five-year migration in relation to the size of population. In addition to population turnover through migration, in-migration and out-migration may also be considered separately. In-migration is reflected by the 1961 residence of the inter-provincial five-year migrants;[6] out-migration may be gauged by allocating these five-year migrants to their provinces of residence in 1956.

The impact of inter-provincial five-year in-migration on the population size of the province of residence in 1961 is measured by the in-migration ratio[6]. In this Section the in-migration ratio consists of the in-migrants divided by the 1961 reporting population. The in-migration ratio for five-year (1956-61) inter-provincial migration is highest in the two far-western provinces – Alberta and British Columbia – where the ratio is roughly seven per cent.[7] In-migration ratios of roughly five per cent are shown by Prince Edward Island and by New Brunswick, and ratios somewhat above four per cent are shown by the remaining Maritime and western provinces. This ratio is three per cent or less in Newfoundland, Quebec and Ontario.

The impact of the five-year inter-provincial out-migration on the province of residence in 1956 is reflected by a ratio whose denominator is the 1961 reporting population minus net migration (which will henceforth be called the "approximate exposed population").[6] The numerator of this out-migration ratio is the number of five-year inter-provincial migrants leaving the relevant province. The out-migration ratio is highest among the Maritime and Prairie Provinces. Saskatchewan and Manitoba head the list, with out-migration ratios slightly above seven per cent. The remaining Maritime and Prairie Provinces have out-migration ratios in the six to seven per cent range. Among the remaining provinces an out-migration ratio of four per cent is shown by British Columbia and Newfoundland, Quebec and Ontario all have ratios below three per cent.

Thus it may be said, in summary, that the impact of this five-year inter-provincial migration upon provincial population size was highest among the Maritime and Prairie Provinces. The only marked exception to this ob-

servation was the in-migration ratio for British Columbia, which was the second highest among the provinces (the highest being that of Alberta). The highest out-migration ratios (for 1956-61 inter-provincial migration) belong to Saskatchewan and Manitoba.

The above-mentioned pattern of provincial differentials in inter-provincial migration ratios differs markedly from that observed in the only other body of somewhat comparable census data – the data from the 1941 Census, which refer to inter-provincial migration in the 1931-41 decade. Even if the two bodies of inter-provincial migration data were fully comparable, it should be recalled that the Canadian economy was undergoing quite different experiences in these two periods; 1931-41 contained much of the Great Depression, which was particularly severe on the Prairie Provinces.

The second highest volume of inter-provincial migration over the 1931-41 decade was that of Saskatchewan, the highest being that of Ontario. In all the western provinces the gross inter-provincial migration ratio for the 1931-41 decade exceeded 10 per cent; it was 15 per cent or more in British Columbia, Saskatchewan and Manitoba. Only British Columbia had an in-migration ratio of at least 10 per cent for the 1931-41 decade. The out-migration ratio for this decade was clearly much higher among the Prairie Provinces than in the other provinces, exceeding 10 per cent in Saskatchewan and being somewhat below 10 per cent in Manitoba and Alberta. In all but one (Prince Edward Island) of the remaining provinces the out-migration ratio for the 1931-41 decade was less than five per cent. It is likely that the pattern of provincial differentials in the impact of the 1931-41 inter-provincial migration on population size reflects the provincial differentials in the severity of the Great Depression (cf. MacKintosh, 1939, ch. 6).

Caution should be exercised in comparing the patterns of provincial differences shown by Tables 2.1 and 2.2. It is not merely in the character and length of the relevant historical period that these figures differ. The out-migrants in Table 2.1 were all residing outside their 1961 province-of-residence on June 1, 1956. For this reason, and also because the figures do not reflect multiple and return migrations over the period June 1, 1956 – June 1, 1961, the figures are said to refer to *five-year* migrants. The figures in Table 2.2 do *not* refer to 10-year migrants but instead refer to persons who resided outside the May 31, 1941 province-of-residence *at any time* over the 1931-41 intercensal period. Despite these strictures, the figures suggest that the pattern of inter-provincial migration flows varies over time, reflecting regional differences in the impact of economic change.

Table 2.2 – Inter-provincial Migration Ratios,[a] Canada, 1931-41

Province	1941 population	In-migration ratio[b]	Out-migration ratio[b]	Net migration ratio[b]	Gross migration ratio[b]	Per cent of in-migrants	Per cent of out-migrants
	A	B	C	D	E	F	G
	'000						
Canada[c]	11,490	4.0	3.9	0.0	7.9	100.0	100.0
Prince Edward Island	95	2.1	5.1	– 3.2	7.3	0.4	1.1
Nova Scotia	578	2.9	2.6	0.4	5.6	3.7	3.3
New Brunswick	457	2.6	4.1	– 1.5	6.7	2.6	4.2
Quebec	3,332	1.8	1.8	0.1	3.6	13.4	13.0
Ontario	3,788	3.6	1.9	1.8	5.5	30.3	15.2
Manitoba	730	5.5	9.2	– 4.1	14.8	8.8	15.4
Saskatchewan	896	2.7	12.8	– 11.6	16.0	5.3	28.3
Alberta	796	5.3	8.0	– 3.0	13.4	9.2	14.6
British Columbia	818	14.6	3.0	11.9	18.3	26.1	4.9

[a] The data reflect reports of migration at any time from June 1, 1931 to Apr. 30, 1941.
[b] See Table 2.1, footnotes [c] and [d].
[c] Exclusive of the Yukon and Northwest Territories.

SOURCES: Farrar, 1963, Table IV-1; 1961 Census, DBS 92-539, Table 6.

Despite the influence that the population size of a province tends to have on its share of inter-provincial migrants, there is some interest in the sheer number of migrants. At least it indicates the major provincial origins and destinations of the inter-provincial migration streams. For example, column H of Table 2.1 indicates that if a five-year migrant (1956-61 period) were leaving a province, the three provinces he was most likely to be departing were Ontario, Quebec and Saskatchewan. The three provinces a five-year migrant was most likely to enter were Ontario, British Columbia and Alberta.

In the 1931-41 decade, Saskatchewan was by far the most prominent origin of inter-provincial migration (Table 2.2); almost twice as many inter-provincial migrants left Saskatchewan as left Ontario. Manitoba and Alberta were among the four most prominent sources of inter-provincial migration in that decade (the other two being Saskatchewan and Ontario). In regard to prominence among destinations of inter-provincial migrants in the 1931-41 decade, Ontario and British Columbia were the clear leaders (Table 2.2). At a considerable distance behind these provinces were Quebec and Alberta. Thus, although size may influence the share of province in the number of inter-provincial migrants, its influence may be markedly attenuated in periods containing strong provincial differentials in the impact of a major economic change such as a depression.

2.2.2 HISTORICAL SHIFTS IN THE MAJOR ORIGINS AND DESTINATIONS– According to the work of Buckley, 1963, p. 21, there have been marked historical shifts in the relative importance of the major destinations of Canadian-born migrants. In the latter part of the nineteenth century the United States was the major destination. Concomitant with the era of western settlement, there were strong streams of migration into the Prairies in the early decades of this century. In the more recent decades, Ontario and British Columbia have tended to get the major shares of the in-migrants. These patterns are broadly confirmed by Farrar, 1962, pp. 33 - 54.

Hurd, 1943, pp. 2 - 13, has presented a review of some of the prominent trends in Canadian population redistribution over the 1851 - 1931 period. In 1851 - 61 the Canadian population showed little tendency to move out of the traditional areas of settlement in the lower St. Lawrence Valley. By 1871, however, there were some shifts toward the less densely populated parts of the eastern provinces and there was a perceptible movement into Western Canada. During the next three decades, this pattern of internal redistribution was generally continued and was joined by a massive wave of emigration to the United States (particularly from Quebec and the Maritimes). Hurd's analysis suggests only two major destinations for Canadian migrants in the latter third of the nineteenth century – cities and the United States.

In the last decade of the nineteenth century this pattern was altered markedly by the first swellings of the forthcoming massive wave of movement into Western Canada. By 1901 - 11 the western movement assumed its full force and 60 per cent of the Canadian population increase was accounted for in the formerly sparsely settled western regions (Hurd, 1943, p. 4). The western expansion continued strongly into the next decade (1911 - 21), although the level of population redistribution had fallen markedly below its peak in 1901 - 11. By 1921 - 31 the prominence of westward movement among the Canadian migration streams had been diminished markedly.

The above-mentioned findings from the work of Buckley (1963), Farrar (1962) and Hurd (1943) are broadly consistent with the census data on province of birth for residents in each province. At each census the province-of-birth distribution has been shown for the native-born residents of a given province. These data are affected by the mortality and the international migration of native Canadians. To the extent that there have been marked province-of-birth differentials in mortality and external migration rates, the unadjusted census place-of-birth tabulations may provide a significantly distorted picture of the pattern of inter-provincial migration. For the following discussion it will be assumed that these distortions do not affect markedly the *rank ordering* of provinces on the selected measures.

The census province-of-birth distributions for the residents of each province (Buckley, 1960, Table 1) show that in 1871 the Canadian residents living outside their province of birth were concentrated mainly in Ontario, Quebec and New Brunswick. In 1881 Manitoba replaced New Brunswick as one of the three provinces having the highest numbers of Canadian residents living outside their province of birth. A westward shift had begun in the identities of the three provinces having the highest number of Canadian residents living outside their province of birth. By 1911, which ended the major intercensal decade for western expansion, the Prairie Provinces had the three highest numbers of Canadians living outside their province of birth but this dominance was short-lived. In 1921 Ontario replaced Manitoba among the top three provinces; in 1941 Ontario resumed its position at the top and the next two provinces in the ranking were British Columbia and Saskatchewan; in both 1951 and 1961 the three provinces showing the highest numbers of Canadians living outside their province of birth were Ontario, British Columbia and Alberta (cf. Buckley, 1960, Table 1, and 1961 Census, DBS 92-547, Table 49).

2.2.3 HISTORICAL GLIMPSES OF THE IMPACT OF INTER-PROVINCIAL MIGRATION ON POPULATION SIZE IN SENDING AND RECEIVING AREAS – The census data on persons residing outside their province of birth also provide some historical glimpses of the impact of inter-provincial migration upon the populations in the sending and receiving areas. These glimpses are, however, only partially adequate, for the reasons mentioned in the second last preceding paragraph. The proportion of a province's natives residing outside the province at a given census provides a reflection of the direct impact of migration over the past several decades upon the province's population. Clearly the reflection is only partially adequate, as it is affected by mortality and international migration. This ratio may be called the "unadjusted life-time out-migration ratio".

Up to 1931 the unadjusted life-time out-migration ratio was consistently highest for the provinces of Manitoba and Prince Edward Island (cf. Buckley, 1960, Table 1 and 1961 Census, DBS 92-547, Table 49). This observation means that among the residents of Canada, those who were born in these provinces consistently showed the highest tendency to be living *outside* their province of birth at each census up to 1931. Since 1941 this tendency was most marked for Saskatchewan and Manitoba, with Prince Edward Island in third position. Over the nine censuses from 1881 to 1961, the tendency for native *Canadian residents* to be living outside their province of birth was least in British Columbia, Quebec and Nova Scotia.

The proportion of a province's native residents born outside that province is a rough indicator of the direct impact upon the receiving population

of migration over several past decades. Throughout the 1881 - 1961 period this proportion was markedly higher in the western than in the eastern provinces; before 1901 it was highest in Manitoba and British Columbia, and since 1901 it was highest in British Columbia and Alberta. In 1961 more than one half of the native residents of British Columbia were born outside that province and almost one third of the native residents of Alberta were not born in Alberta. Generally, the proportion of a province's native residents who were born outside the province have been least in Quebec, Prince Edward Island and Nova Scotia. Thus it would appear that over the past several decades the impact of inter-provincial migration upon the provincial native-born population has been highest in Western Canada, particularly in British Columbia and Alberta, and least in Quebec, Prince Edward Island and Nova Scotia. (Data sources given in preceding paragraph.)

2.2.4 PATTERN OF SPECIFIC INTER-PROVINCIAL MIGRATION STREAMS – Each province sends its out-migrants to several different provinces. The distribution of these out-migrants among the alternative destinations shows a definite pattern that reflects the distance between origin and destination, the populations origin and destination, and socio-economic and other geographic characteristics of these areas.

Ontario is clearly the favourite destination for the 1956 - 61 five-year migrants out of each of the Atlantic provinces (Chart 2.3). The bulk of the remaining five-year out-migrants from Newfoundland, Prince Edward Island and Nova Scotia remained within the Maritime provinces. A high proportion of Nova Scotia's five-year out-migrants to provinces other than Ontario went to the far west and to Quebec and, in terms of their numbers, those from New Brunswick went primarily to Ontario, Quebec and Nova Scotia. In general, the attraction of Ontario was enough to offset the relatively far distance that must be covered in travelling from the Atlantic provinces. Thus, for *none* of the Atlantic provinces was the contiguous province the principal destination of out-migrants.

Ontario was the favourite destination for Quebec's five-year out-migrants, and Quebec was the most favoured destination for Ontario's five-year out-migrants. As Chart 2.3 shows, the dominance of Ontario as the destination of Quebec's five-year out-migrants was very great, that province received over 70 per cent of them and the remainder went mainly to nearby Maritime provinces (Nova Scotia and New Brunswick) and to the far west (British Columbia and Alberta). The five-year out-migrants from Ontario were somewhat more evenly distributed among the various provinces; 35 per cent went to Quebec and, aside from Quebec, British Columbia was the most favoured provincial destination; a significant proportion went to Manitoba and Alberta and a somewhat lesser proportion to the Atlantic region.

For the 1956-61 period, the five-year out-migrants from western provinces were heavily concentrated among destinations west of Quebec, there being a strong tendency for these out-migrants to be located in provinces contiguous to the province of origin. Manitoba's five-year out-migrants settled mainly in Ontario, British Columbia and Alberta; Saskatchewan's five-year out-migrants settled mainly in Alberta, British Columbia and Manitoba; and the bulk of the five-year out-migrants from Manitoba and Saskatchewan travelled westward. Quebec and the Atlantic provinces together received but a minor proportion.

Alberta and British Columbia form a pair similar to Ontario and Quebec in that each member of the pair had the largest portion of the other member's out-migrants. The *second* most favoured destination for the out-migrants from British Columbia and Alberta was *not* a western province, but was Ontario.

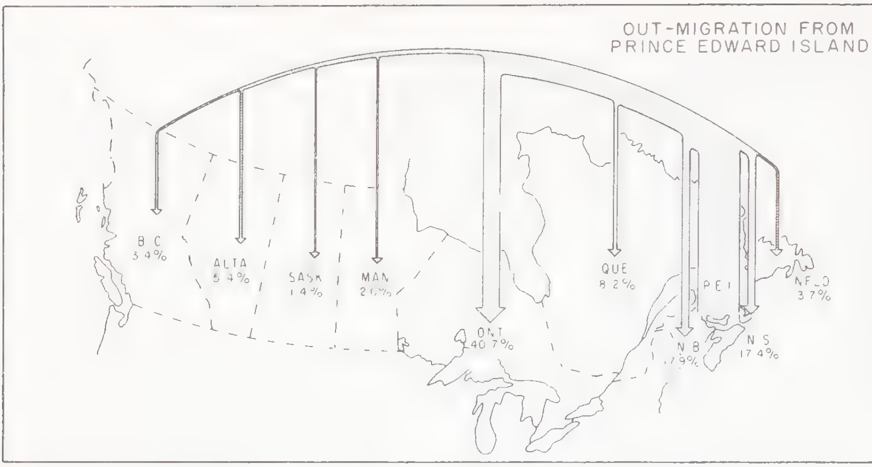
CHART-2.3a

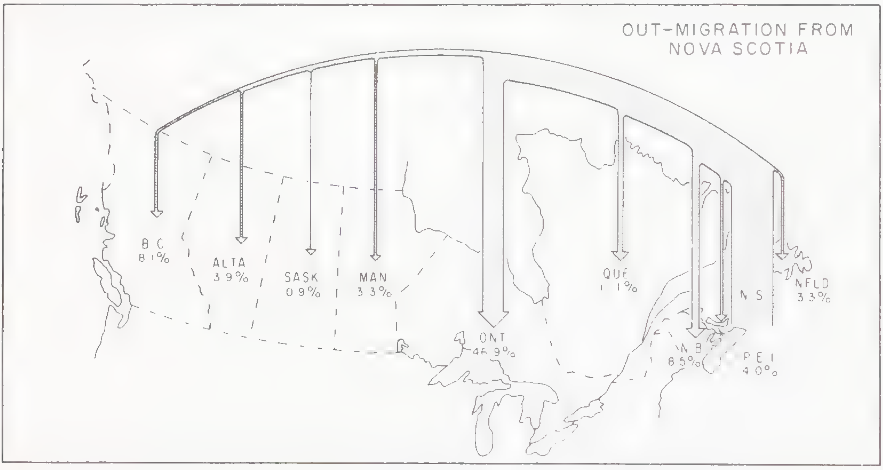
RELATIVE SHARES OF PROVINCIAL DESTINATIONS IN THE NUMBER OF FIVE-YEAR OUT-MIGRANTS FROM EACH PROVINCE OF ORIGIN, CANADA, 1956-61

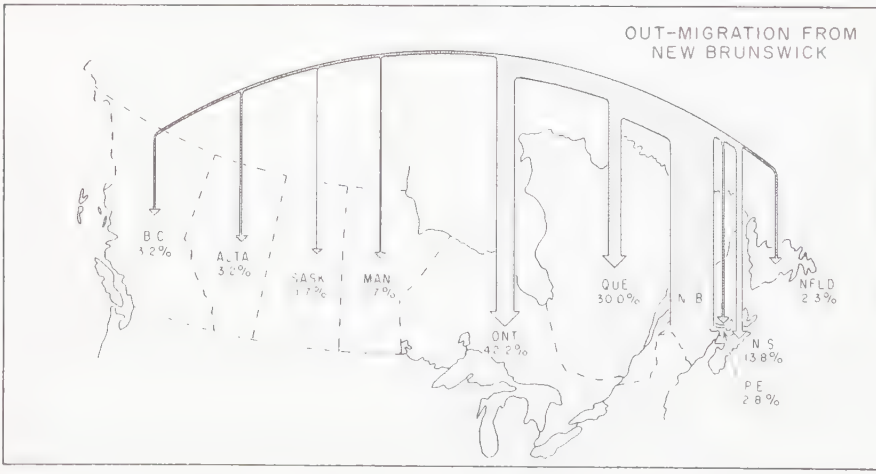
(ARROWHEADS SHOW THE PROVINCIAL DESTINATIONS OF EACH SET OF OUT-MIGRANTS FROM A PARTICULAR PROVINCE. THE RELATIVE WIDTHS OF THE ARROW STEMS CORRESPOND TO THE PERCENTAGE SHARES OF THE DESTINATIONS IN THE NUMBER OF THESE OUT-MIGRANTS)

Source: 1961 Census, DBS 98-509

CHART-2.3b


OUT-MIGRATION FROM
PRINCE EDWARD ISLAND
B.C.
3.4%
ALTA
5.4%
SASK
1.4%
MAN
QUE
8.2%
P.E.I.
NFLD
3.7%
ONT
40.7%
N.B.
N.S.
17.4%


OUT-MIGRATION FROM
NOVA SCOTIA
B.C.
8.1%
ALTA
3.9%
SASK
0.9%
MAN
3.3%
QUE
11.1%
N.S.
NFLD
3.3%
ONT
46.9%
N.B.
8.5%
P.E.I.
4.0%


OUT-MIGRATION FROM
NEW BRUNSWICK
B.C.
3.2%
ALTA
3.2%
SASK
MAN
QUE
30.0%
N.B.
NFLD
2.3%
ONT
N.S.
13.8%
P.E.
2.8%

CHART—2.3c

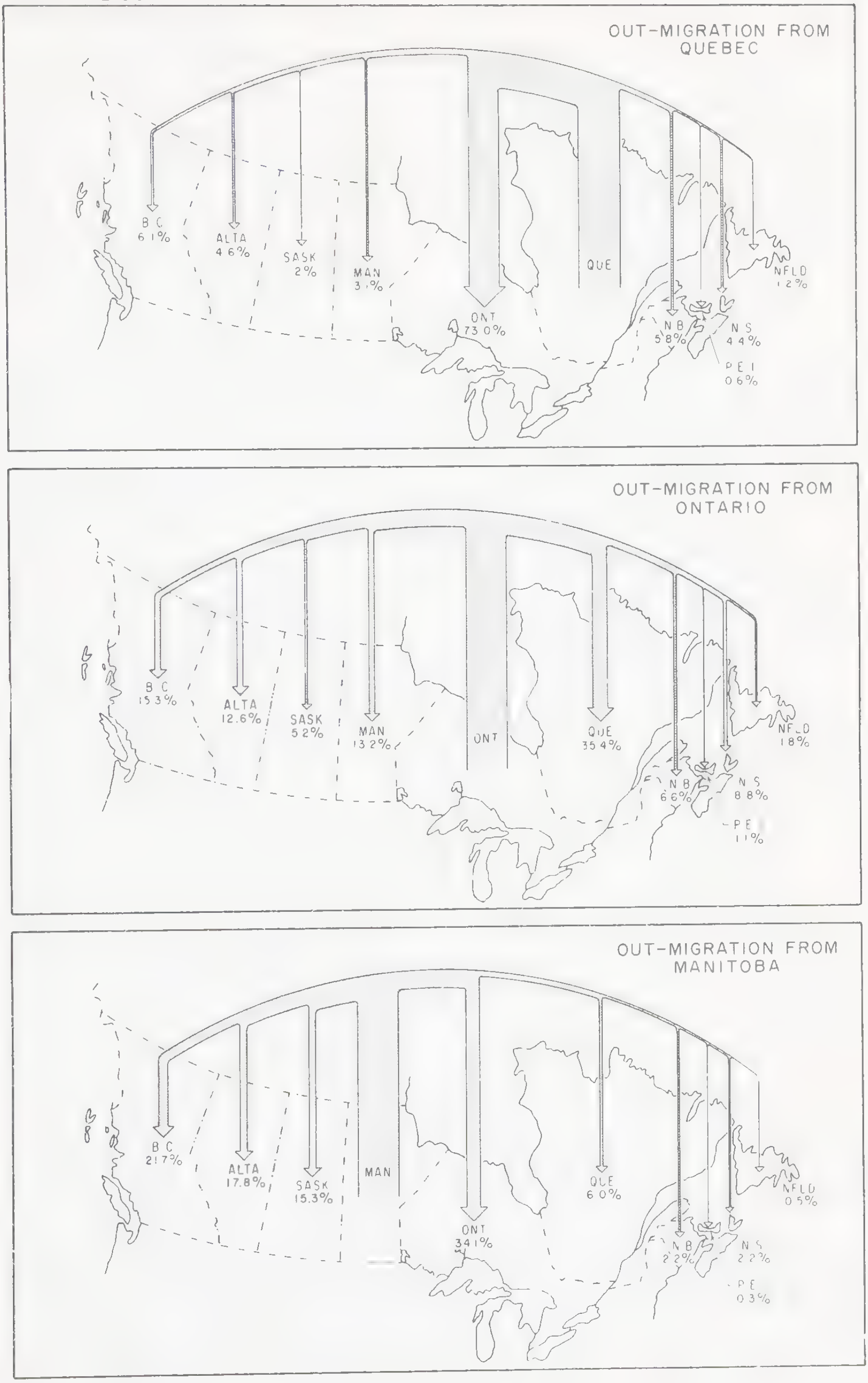
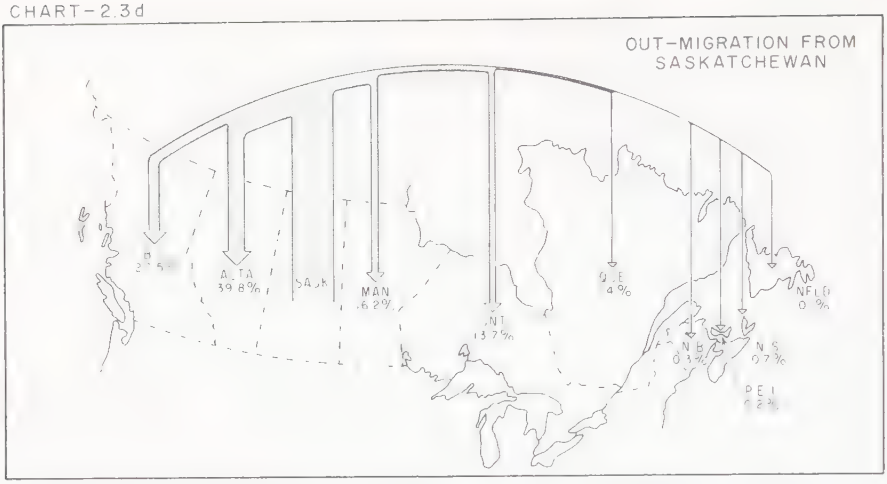
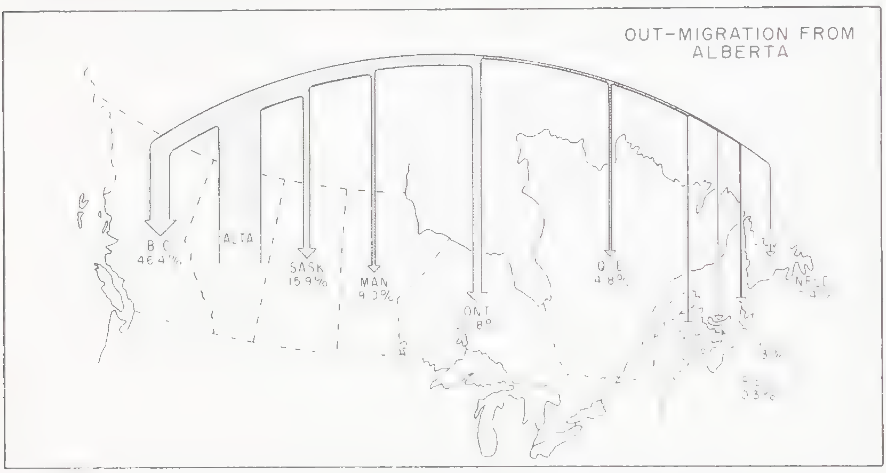
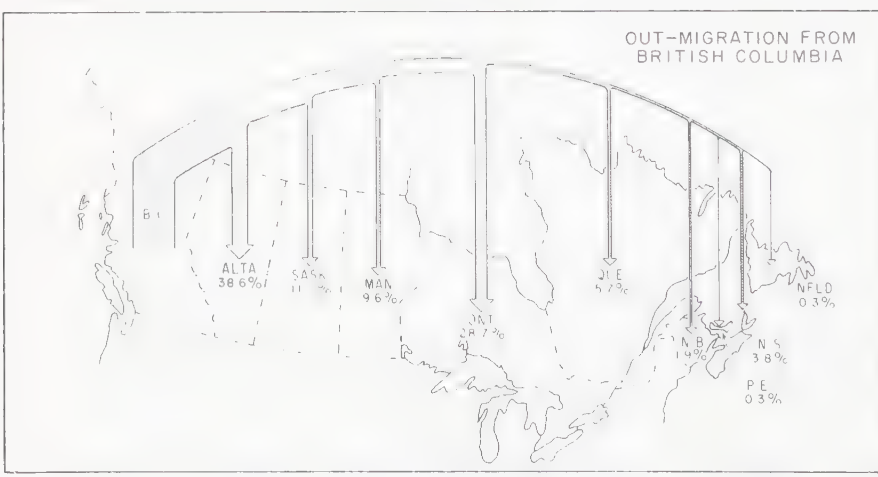

OUT-MIGRATION FROM QUEBEC
B.C. 6.1%
ALTA 4.6%
SASK 2%
MAN 3.1%
ONT 73.0%
QUE
N.B. 5.8%
N.S. 4.4%
P.E.I. 0.6%
NFLD 1.2%
OUT-MIGRATION FROM ONTARIO
B.C. 15.3%
ALTA 12.6%
SASK 5.2%
MAN 13.2%
ONT
QUE 35.4%
N.B. 6.6%
N.S. 8.8%
P.E.I. 1.1%
NFLD 1.8%
OUT-MIGRATION FROM MANITOBA
B.C. 21.7%
ALTA 17.8%
SASK 15.3%
MAN
ONT 34.1%
QUE 6.0%
N.B. 2.2%
N.S. 2.2%
P.E.I. 0.3%
NFLD 0.5%

CHART-2.3d


OUT-MIGRATION FROM
SASKATCHEWAN
ALTA
39.8%
SASK
MAN
ONT
NFLD


OUT-MIGRATION FROM
ALBERTA
ALTA
SASK
15.9%
MAN


OUT-MIGRATION FROM
BRITISH COLUMBIA
ALTA
38.6%
MAN
ONT
NFLD
0.3%
P.E.
0.3%

None of the inter-provincial migration streams mentioned above were large enough to exceed three per cent of the average of the populations of the sending and receiving areas.[8] The streams that exceeded one per cent of the average populations of the sending and receiving populations were heavily concentrated in Western Canada. According to the sample data, only two streams originating in the eastern or central provinces exceeded one per cent of the average of the sending and receiving populations – the streams from Nova Scotia to New Brunswick and from Quebec to Ontario.

The pattern of inter-provincial migration streams shown by Chart 2.3 is very similar to that observed from the 1941 Census data concerning migration over the 1931-41 decade (1941 Census, Vol. II, Table 62). Each member of the Quebec-Ontario pair had the largest number of the other's out-migrants. The out-migrants from the western provinces settled west of Quebec for the most part, and were markedly attracted to a province that was contiguous to the province of origin.

There are two major differences between the patterns shown by Chart 2.3 for 1956-61 and that observed for 1931-41. In 1931-41 most of the out-migrants from the Maritime provinces went to other Maritime provinces; the main exception was Nova Scotia, most of whose out-migrants went to Ontario. In 1931-41 the great majority of Saskatchewan's out-migrants went to British Columbia and Ontario instead of to Alberta and British Columbia as they did in 1956-61. The work of Farrar with data for persons residing outside their province of birth suggests that the basic pattern of inter-provincial migration streams has been roughly the same over the three decades from 1921 to 1951 (Farrar, 1962, pp. 36-57).

2.2.5 NET INTER-PROVINCIAL MIGRATION – The flows of population into and out of provinces generate net shifts in population from migration. These net shifts (called "net migration") are of considerable importance in the study of provincial differences in population growth and economic change. It is therefore appropriate to indicate the net migration patterns generated by the flows reviewed in previous Sections.

Ontario, Alberta and British Columbia were the only provinces having net migration gains in the 1956-61 five-year internal migration, according to the Population Sample estimates. This statement holds true for the key age group of 20-34[9] as well as for the whole reporting population in 1961 (Table 2.1). In British Columbia the net five-year internal migration[10] was roughly three per cent of the 1961 population aged five and over and in Alberta and Ontario it was somewhat lower (Table 2.1). Thus, the general level of the net internal migration ratio in these three provinces was low and it is mainly the *positive direction* of the ratio in these provinces that should be considered particularly notable.[7]

Among the seven provinces that sustained net losses through the 1956-61 five-year migration, only Saskatchewan had a net migration ratio (for persons aged five and over in 1961) algebraically lower than *minus* three per cent; the net migration ratio for that province was *minus* four per cent. Among the other six losses in the 1956-61 five-year migration, only Nova Scotia and Manitoba had net migration ratios algebraically lower than *minus* two per cent.

In the highly mobile 20-34 age group, more substantial levels of five-year net migration ratios were shown by some of the provinces. Among the net gainers, Alberta showed a net migration ratio in excess of four per cent. Among the net losers, net migration ratios below *minus* five per cent were shown by Nova Scotia and Saskatchewan but none of the net losers had ratios below *minus* 10 per cent.

In general, the 1961 Population Sample data indicate systematic, though not prominent, provincial differentials in the *net inter-provincial* five-year migration. The provinces enjoying the highest levels of income, modernization and economic growth in recent decades (Economic Council of Canada, 1965, ch. 5; Wilson, Gordon and Judek, 1965, ch. 5) were the only ones sustaining net gains in the 1956-61 five-year migration. The provinces having the highest concentrations of work force in primary activities (Economic Council of Canada, 1965, ch. 5, Wilson, Gordon and Judek, 1965, ch. 5) had the sharpest net losses in the 1956-61 five-year migration ratios, particularly Saskatchewan and Prince Edward Island.[11]

Table 2.3 shows that the net losses (in 1956-61 five-year migration) of the Atlantic provinces and Quebec were primarily to Ontario and secondarily to other provinces in this group. The net losses of the Atlantic and Quebec provinces to western provinces were mainly to Alberta and British Columbia in the far west. The net gains of Ontario were mainly from Quebec and Nova Scotia in the east and from Manitoba and Saskatchewan in the west. The five-year migration between Ontario and the two far western provinces (Alberta and British Columbia) resulted in a net *loss* to Ontario.

Among the western provinces, the net losses shown by Manitoba and Saskatchewan (in the 1956-61 five-year migration) were mainly to Alberta and British Columbia. The net gains of Alberta were entirely from provinces lying to the east of Alberta—the other Prairies and Ontario in particular. In the five-year migration between Alberta and British Columbia, Alberta sustained a net *loss*. Alberta and British Columbia stand out in showing net migration gains from almost all of the other provinces. The great majority of the net gain enjoyed by British Columbia derived from five-year migration among the western provinces, the net gain of that province from Ontario being generally much lower.

Table 2.3 – Distributions of Net Gains and Losses Among Opposing Pairs of Inter-provincial Migration Streams, Canada, 1956-61

NOTE.—Let "A" and "B" represent two provinces. Persons living in B in 1961 who were residents of A in 1956 comprise one inter-provincial five-year migration stream; those living in A in 1961 who resided in B in 1956 form another stream. These two streams are the *opposing* pair of streams for the provinces A and B. Using one of these provinces as the province of reference, the stream flowing into it consists of in-migrants and that flowing out consists of out-migrants; in-migrants *minus* out-migrants gives the net gain (if the difference is positive) or the net loss (if the difference is negative) *to the province of reference* from this opposing pair of streams. The provinces of reference are set in the *stub* of this table. For each province of reference the net gains are totalled and expressed as percentages of the total (see the numbers *without* parentheses in each row), and the net losses are treated similarly (see the numbers *within* parentheses in each row). For example, the second row shows that 84 per cent of the net gains to Prince Edward Island were from Nova Scotia, and that 64 per cent of the net losses from Prince Edward Island were to Ontario.

Province of residence in 1961	Province of residence in 1956: Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
	Age five and over									
Newfoundland	—	100.0	(12.6)	(0.3)	(12.0)	(59.7)	(1.1)	(2.9)	(4.5)	(6.9)
Prince Edward Island	(9.5)	—	84.0	(13.8)	(0.9)	(64.0)	7.5	8.5	(8.6)	(3.3)
Nova Scotia	89.2	(3.5)	—	(21.4)	(7.5)	(54.6)	(0.5)	10.8	(4.9)	(7.7)
New Brunswick	0.3	5.5	76.9	—	(47.0)	(49.9)	16.1	(0.1)	(3.0)	1.1
Quebec	7.8	0.2	15.9	60.5	—	(87.0)	14.8	0.8	(3.2)	(9.7)
Ontario	7.6	3.0	22.9	12.7	34.9	—	11.1	7.9	(43.4)	(56.6)
Manitoba	2.6	(0.3)	3.8	(4.0)	(6.2)	(23.6)	—	93.5	(25.5)	(40.5)
Saskatchewan	95.9	(0.2)	(0.2)	4.1	(0.2)	(8.9)	(5.8)	—	(48.7)	(36.1)
Alberta	0.9	0.6	3.1	1.2	2.0	7.4	18.6	66.3	—	(100.0)
British Columbia	1.0	0.2	3.8	(100.0)	4.5	7.3	22.2	37.0	24.0	—
	Age 20-34									
Newfoundland	—	100.0	(11.4)	(2.0)	(13.1)	(62.2)	(3.1)	(1.1)	(2.8)	(4.3)
Prince Edward Island	(3.3)	—	82.0	(8.6)	10.7	(74.6)	7.3	(0.6)	(8.5)	(4.5)
Nova Scotia	87.3	(1.6)	—	(16.8)	(10.8)	(57.9)	(0.8)	12.7	(6.8)	(5.3)
New Brunswick	2.9	4.7	79.4	—	(43.9)	(47.9)	13.0	(0.9)	(4.4)	(2.9)
Quebec	8.2	(0.3)	21.3	57.7	—	(82.7)	11.0	1.8	(3.7)	(13.3)
Ontario	9.8	4.3	28.9	15.9	25.8	—	9.2	6.1	(61.7)	(38.3)
Manitoba	10.2	(0.1)	8.4	(2.8)	(29.6)	(18.6)	—	81.5	(26.2)	(22.6)
Saskatchewan	34.2	6.6	(0.3)	59.2	(0.6)	(7.8)	(5.0)	—	(59.8)	(26.5)
Alberta	0.6	0.6	4.5	1.9	1.5	12.5	17.0	61.4	—	(100.0)
British Columbia	1.3	0.5	5.1	1.9	8.0	11.4	21.6	40.2	10.0	—

SOURCE: 1961 Census, DBS 98-509, Table I-3.

Relative distances between provinces are clearly influential in determining the levels of net migration between selected pairs of provinces, as are the relative population sizes of the provinces. Even when relative distances and populations are taken into account, however, it is likely that a significant portion of the net migration between any two provinces reflects their relative shares in economic and social 'opportunities'. Chapter Five provides further discussion on this topic.

2.2.6 HISTORICAL PERSPECTIVE ON PROVINCIAL DIFFERENTIALS IN NET MIGRATION — As mentioned above, a historical series on net interprovincial migration is not available. As an alternative it is useful to review indirect estimates of provincial differentials in net migration, although these estimates are influenced by external as well as by internal migration.

The net 1956-61 migration ratio for all persons, as estimated indirectly from vital statistics and population counts,[12] shows a pattern of provincial variation roughly similar to that shown by the data for *inter-provincial* (internal) net migration among persons aged five and over and residing in private households in 1961. This similarity is shown in Table 2.4, columns F and G. The principal difference between these two columns is the net migration *gain* shown for Quebec province in the data for all persons (column F), contrasting with the net loss shown for Quebec in the data for the population aged five and over and in private households. With this sole exception, the net gainers and net losers are the same in columns F and G of the table. The rank correlation between the two sets of net migration ratios is high.

Table 2.4 provides a glimpse into the historical pattern of provincial differentials in the crude decennial net migration ratio, at least since the 1920s. Over the four decades from 1921 - 31 to 1951 - 61, Ontario and British Columbia consistently showed net gains in this ratio which covers all ages and, consistently, the ratio was higher for British Columbia than for Ontario. In each of these decades, net migration losses were shown by Prince Edward Island, New Brunswick and Manitoba. Among the remaining provinces, Quebec and Alberta were similar in showing net gains in 1921 - 31 and 1951 - 61 only, the ratios for Alberta being generally higher than those for Quebec. Nova Scotia and Saskatchewan sustained net migration losses in three of the four decades.

Table 2.4 shows clearly that in each of the four decades from 1921 - 31 to 1951 - 61 the level of the crude provincial net migration ratio was usually less than 10 per cent in absolute value. The principal exceptions were all the ratios for British Columbia and the 1931 - 41 and 1941 - 51 ratios for Saskatchewan. With these exceptions mainly, it is clear that the decennial

Table 2.4 – Net Intercensal Migration Ratios,[a] Canada and Provinces, 1921 - 1961

Province	Vital statistics estimate[b]						Sample estimate age five and over 1956 - 61[c]
	1921 - 31	1931 - 41	1941 - 51	1951 - 61	1951 - 56	1956 - 61	
	A	B	C	D	E	F	G
Canada[d]	**2.4**	**– 0.9**	**1.3**	**7.0**	**4.1**	**3.0**	**–[e]**
Newfoundland	—	—	—	– 6.7	0.3	– 3.7	– 1.2
Prince Edward Island	– 10.2	– 3.3	– 12.4	– 10.8	– 8.1	– 2.9	– 1.3
Nova Scotia	– 12.0	1.5	– 6.4	– 4.9	– 1.6	– 3.2	– 2.5
New Brunswick	– 9.3	– 2.3	– 8.6	– 6.6	– 3.9	– 2.8	– 1.1
Quebec	0.6	– 0.1	– 0.3	4.4	2.3	2.2	– 0.2
Ontario	4.9	2.1	7.3	12.6	7.5	5.3	0.7
Manitoba	– 1.5	– 6.7	– 8.1	– 0.5	—	– 0.4	– 2.1
Saskatchewan	1.4	– 17.4	– 23.0	– 9.0	– 4.3	– 4.6	– 4.4
Alberta	5.9	– 5.5	– 0.8	11.2	6.2	5.3	1.6
British Columbia	19.9	10.8	23.3	17.2	10.5	6.9	2.5

[a] The net migration ratio is 100 (net migration/population at beginning of decade). These data reflect both internal and external migration.

[b] The vital statistics estimate of net migration is intercensal population change *minus* intercensal births *plus* intercensal deaths. Since population change equals natural increase (births *minus* deaths) plus net migration, the latter is estimated by subtracting natural increase from population change. The estimate is subject to various sources of error (Lee and Lee, 1960).

[c] These figures are based on the 1961 Population Sample estimates of five-year internal migration, and they refer to persons aged five and over in 1961. Thus they must be of a significantly lower order of magnitude than the figures in column F

[d] Exclusive of the Yukon and Northwest Territories.

[e] See footnote [c].

SOURCES: Farrar, 1962, Table II-1; 1961 Census, DBS 99-511, Table 2; 1956 Census, Vol. III, Table 2.

net inter-provincial[13] migration ratio was relatively low, and net intercensal migration probably contributed less than half of provincial population growth in almost all of these decades. This statement refers only to the direct impact of the net migration for a given decade upon the population growth of that decade; it may not hold true when the indirect impact of the decade's net migration (the natural increase contributed by migrants) is added to the direct contribution. The statement probably does not hold true for the cumulative impact of net migration upon population growth over several decades because, in this case, the natural increase of the descendants of migrants must be attributed at least partly to the migration factor.

Further indications of the historical pattern of provincial differentials in net intercensal migration ratios are shown by Charts 2.4 and 2.5. These

charts present survival ratio estimates[14] of net intercensal migration for persons aged 10 and over and 20 - 39 at the end of each decade. British Columbia and Ontario still dominate the picture for positive net migration ratios. However, British Columbia alone showed net migration gains throughout the period for which British Columbia estimates are available (1881 - 91 to 1951 - 61). Like all the other central and eastern provinces, Ontario had net migration *losses* in the decades from 1871 - 81 to 1891 - 1901. It may be recalled that in these decades Canada sustained heavy waves of emigration (mainly to the United States) and that the balance of net external migration was negative (cf. Hurd, 1943; and Camu, Weeks and Sametz, 1964, Table 3.1).

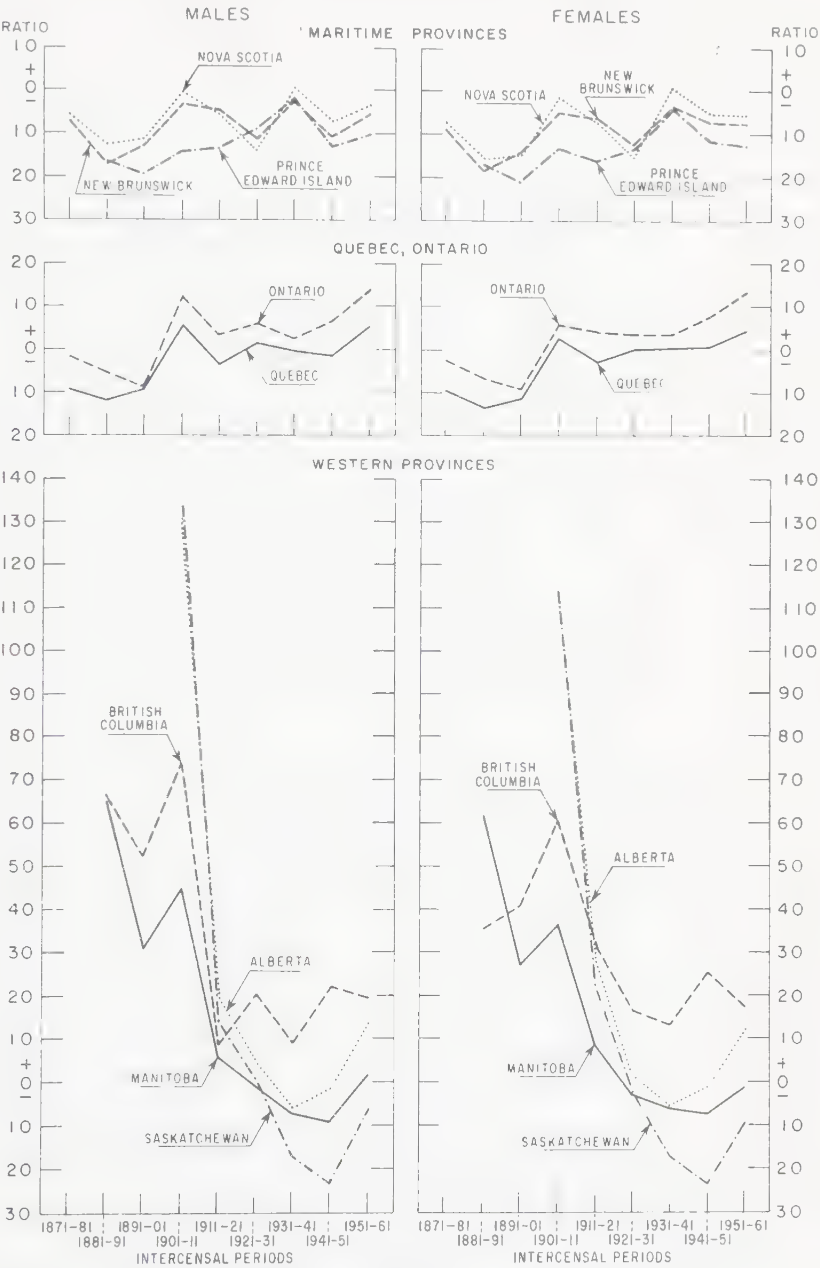
The net migration losses among Prairie Provinces are concentrated within the 1921 - 61 period; up to 1921 - 31 no Prairie Province had net migration losses. As one might expect of a very relatively young region (in terms of a history of considerable human settlement), the whole of Western Canada had very high levels of net migration during its major period of settlement from the 1880s to the 1910s. Alberta stands out among the Prairies in having distinct or high net migration gains in four of the six decades for which estimates are available.

Negative decennial net migration ratios have been typical of the Maritime region throughout the period from 1871 to 1961. The work of a number of analysts (MacKintosh, 1939, pp. 82 - 86; Caves and Holton, 1959, pp. 147 - 169; Levitt, 1961, pp. 30 - 41; and Economic Council, 1965, pp. 100 - 106) suggests that this pattern may be attributed in large part to major and sustained economic structural changes which have not favoured the Maritime region.

The data for males in Quebec show more net migration losses than gains in the nine decades from 1871 - 81 to 1951 - 61, while the data for females show the opposite pattern. The net migration gains for both males and females in Quebec were registered mainly in 1901 - 11, 1921 - 31 and 1951 - 61, and in each of these decades the decennial net migration ratio was relatively low. In this century the negative net migration ratios for Quebec were also low in magnitude. Charts 2.4 and 2.5 show clearly that the period of heavy net migration losses to Quebec coincided with that of the heavy emigration waves from Canada (mainly to the United States). According to Blanchard, 1953, pp. 73 - 84, a large portion of the out-migrants from Quebec in this period went to the United States, particularly to its northeastern part.

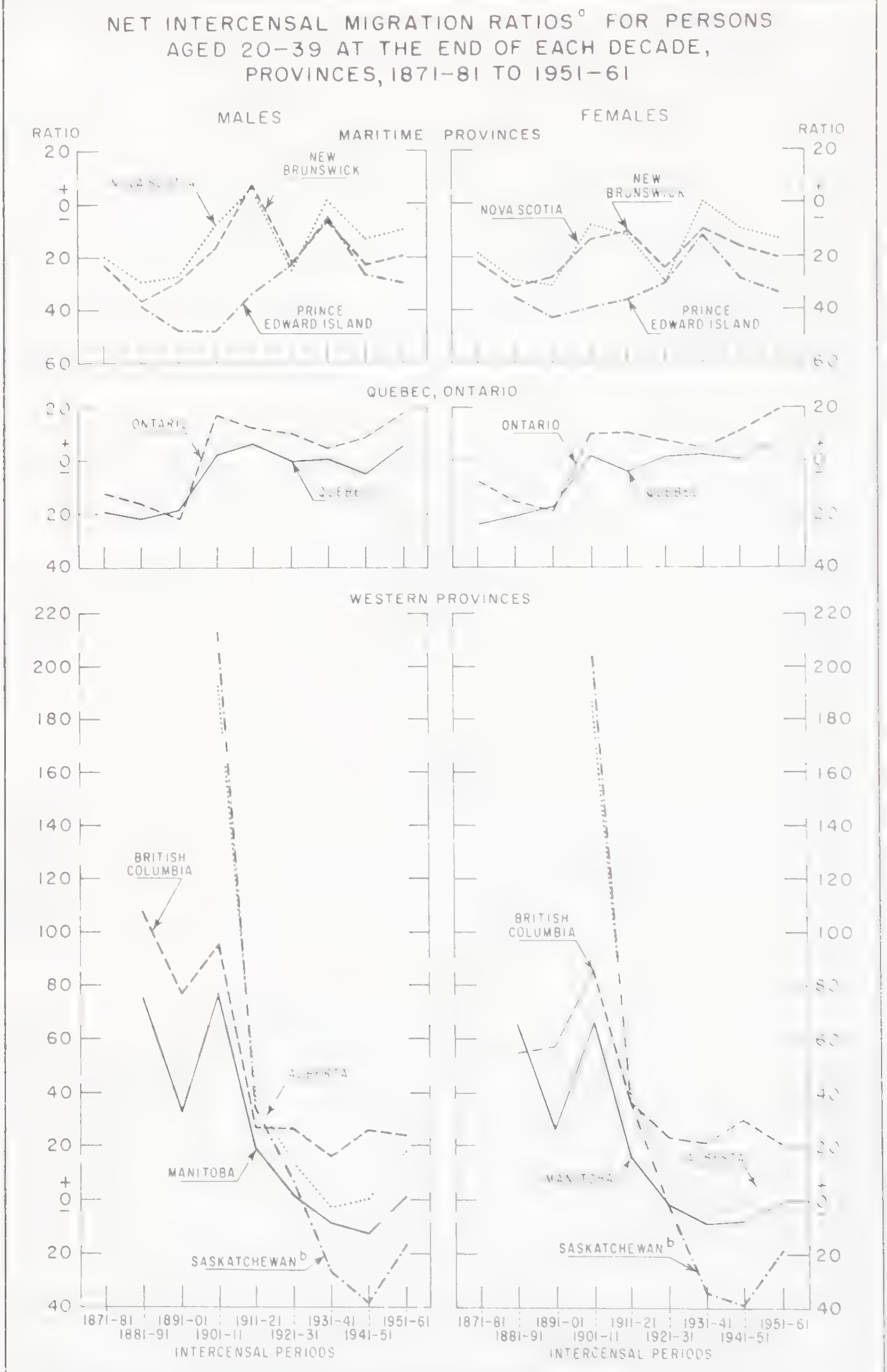
CHART-2.4

NET INTERCENSAL MIGRATION RATIOS[a] FOR THE POPULATION ALIVE AT THE BEGINNING OF EACH DECADE, PROVINCES, 1871-81 TO 1951-61



[a] Net migration ratio = 100 (net migration divided by the average of the beginning-of-decade and end-of-decade populations). See Appendix C for further details. Source: Appendix Table C.2.

CHART—2.5



[a] See Chart 2.4, footnote[a]. [b] See Chart 2.4. Source: Appendix Table C 2.

Thus, in summary, a distinct pattern of provincial differentials in net migration ratios may be observed over the decades since 1871. Only Ontario and British Columbia showed any tendency toward consistent net gains through migration, and this tendency was stronger for British Columbia than for Ontario. Since the Second World War, Alberta has joined Ontario and British Columbia as the three provinces with substantial net migration gains. Along with the other Prairie Provinces, Alberta had very high net migration ratios in the early decades of this century, and marked net losses in the relatively depressed 1931 - 41 decade. With the exception of the 1871 - 1901 period, Quebec showed relatively low net migration ratios in the various decades. In the three decades from 1871 to 1901 Quebec sustained substantial net migration losses. A consistent pattern of decennial net migration losses throughout the 1871 - 1961 period was shown by the Maritime region.

Without intending to advance any naive argument of the *post hoc ergo propter hoc* type, it is difficult to escape the marked resemblances between the persistent pattern of regional income differentials over several decades (Economic Council, 1965, pp. 102 - 105; McInnis, 1967, p. 15) and that of net migration ratio differentials indicated above. Given the commonly accepted generalizations about the relations between regional disparities in economic opportunity and inter-regional migration (see Kuznets and Thomas, 1957, for a famous statement on this point), these resemblances *suggest* the existence of similar relations for the major Canadian regions.[14]

The fact that the foregoing comments pertain to net migration and not to the separate inflows and outflows (for which historical data are unavailable), does not crucially diminish their significance. Although the net result of these flows is typically much smaller in volume than either one (inflow or outflow), and is probably a poor measure of the attractive force exerted by an area upon migration flows, the net migration does measure something important which is not available from separate inflows or outflows. This thing is the *retentive power* of an area among the origins and destinations of migration streams. The areas may vary markedly in the extent to which they tend to *retain* their natural increase *and* their in-migrants. This variation is reflected by *net migration* measures, and its significance in the demographic and economic growth potentials of the areas is too obvious to need further emphasis here. It would seem reasonable to hypothesize that the long-standing pattern of provincial differentials in net migration ratios strongly reflects regional differences in the impact of some major trends and fluctuations in the Canadian economy (particularly as they affect the nature and evolution of regional economic structure).

2.3 DIFFERENTIALS ALONG THE FARM/NON-FARM DIMENSION

From his study of migration data for Canada, Buckley (1963, p. 18) concluded that "the absolute and relative size of the movement of population from farm to non-farm areas in the central and eastern provinces since Confederation and in western provinces since the establishment of the wheat economy are the most significant findings of the study of migration. This has been the largest single movement of population over the past forty years". It is appropriate that a section of this Chapter be devoted to farm/non-farm differentials in Canadian migration. The discussion will be confined largely to the 1961 Census Sample data, however, so as to avoid undue overlap with that in the 1961 Census Monograph on *Urban Development in Canada* (Stone, 1967[a]).

2.3.1 INTERNAL MIGRATION FLOWS FOR BROAD SUBDIVISIONS OF THE URBAN AND RURAL POPULATIONS OF CANADA – At least 15 per cent of the 1961 residents of Canada were five-year internal migrants in the 1956 - 61 period. Table 2.5 shows a high in-migration ratio for all of the selected area types except rural farm. With this exception only, the in-migration for five-year migrants in the 1956 - 61 period is 15 per cent or more in each of the area types. The in-migration ratio for the urban population (18 per cent) only slightly exceeds that for the rural population (16 per cent), a result which partly reflects the very high in-migration ratio (21 per cent) for rural non-farm areas.

Among the six selected area types within the general rural and urban categories, the highest five-year in-migration ratios are observed for the rural non-farm areas and for the urban size group of 1,000 - 9,999, both near 20 per cent. The next highest in-migration ratios are shown in Table 2.5 for the urban size groups of 10,000 - 29,999 and 100,000 and over. As mentioned above, the lowest in-migration ratio is that for the rural farm category (eight per cent).

The impact of the five-year out-migration on approximate exposed population in the area of residence in 1956 is measured by the out-migration ratio. As regards the five-year migration in the 1956 - 61 decade, the out-migration ratio is higher for the urban than for the rural areas. It should be recalled that the migrants in question here are not solely urban-to-rural migrants; they include urban-to-urban and rural-to-rural migrants. The difference in ratios mentioned above simply means that a higher percentage of urban than of rural 1956 population out-migrated from the 1956 municipality of residence.

Among the six selected subdivisions of urban and rural areas, the highest out-migration ratios are shown in Table 2.5 for the two lowest urban

Table 2.5 – Five-Year Internal Migration Ratios by Urban Size Group, Rural Non-farm and Rural Farm, by Sex, Canada, 1956-61

Type of residence in 1961	1961 reporting population[a]	In-migration ratio[b]	Out-migration ratio[b]	Net migration ratio[b]	Per cent of in-migrants	Per cent of out-migrants
	A	B	C	D	E	F
	Age five and over in 1961					
	'000					
Canada	**14,804**	**17.0**	**17.0**	**–**	**100.0**	**100.0**
Urban[c]	10,230	17.6[d]	18.5	– 1.1	71.7	76.3
100,000 and over	6,340	17.6	17.1	0.7	44.6	42.9
30,000 - 99,999	1,389	14.7	14.8	– 0.2	8.1	8.2
10,000 - 29,999	852	17.9	22.6	– 6.0	6.0	8.1
Under 10,000	1,649	19.8	24.5	– 6.2	13.0	17.1
Rural[c]	4,573	15.5[e]	13.4	2.5	28.3	23.7
Non-farm	2,773	20.6	9.3	12.5	22.8	9.0
Farm	1,800	7.6	18.2	– 12.9	5.5	14.7
	Males, age 20-34 in 1961					
	'000					
Canada	**1,611**	**26.1**	**26.1**	**–**	**100.0**	**100.0**
Urban[c]	1,158	26.8	27.8	1.3	74.0	77.7
100,000 and over	732	26.1	25.0	1.5	45.6	43.0
30,000 - 99,999	156	23.7	23.3	0.5	8.8	8.6
10,000 - 29,999	95	28.3	34.2	– 9.0	6.4	8.4
Under 10,000	175	31.7	38.2	– 10.6	13.2	17.7
Rural[c]	453	24.1	21.4	3.4	26.0	22.3
Non-farm	287	31.1	15.7	18.2	21.3	8.8
Farm	165	12.0	28.0	– 22.3	4.7	13.5
	Females, age 20-34 in 1961					
	'000					
Canada	**1,623**	**28.0**	**28.0**	**–**	**100.0**	**100.0**
Urban[c]	1,207	27.5	29.0	– 2.1	73.1	78.7
100,000 and over	766	27.1	25.9	1.6	45.7	43.0
30,000 - 99,999	163	23.7	25.1	– 1.9	8.5	9.2
10,000 - 29,999	98	28.4	36.5	– 12.9	6.1	8.9
Under 10,000	179	32.4	39.7	– 12.1	12.8	17.6
Rural[c]	416	29.4	24.8	6.0	26.9	21.3
Non-farm	284	34.4	16.9	21.1	21.5	8.3
Farm	132	18.5	35.5	– 26.4	5.4	13.0

[a] See Table 2.1, footnote [b].
[b] See Table 2.1, footnotes [c] and [d].
[c] The classification of localities into the six area types shown is based on the 1961 definitions and statistics. For the definitions see 1961 Census, DBS 99-512, pp. 2.1-2.3.
[d] Includes migrants coming from other urban areas.
[e] Includes migrants coming from other rural areas.

SOURCE: Unpublished migration tabulation from the 1961 Population Sample.

size groups (under 10,000 and 10,000 - 29,999). These are also the categories with the highest in-migration ratios among urban size groups. From the five-year migration alone, these smaller urban centres were being subjected to high levels of population turnover.

The out-migration ratio for the rural non-farm population is striking for its relatively low value (Table 2.5). At nine per cent, the out-migration ratio for the rural non-farm population was roughly one half that for the whole urban population. This observation may be accounted for largely by the hypothesis that the rural non-farm reporting population was heavily concentrated in the 'suburbs' of incorporated centres, where out-migration rates were generally low.

2.3.2 URBAN-RURAL INTERNAL MIGRATION – The in-migration and out-migration ratios shown in Table 2.6 indicate that the rural-to-urban and urban-to-rural five-year migrational flows have been relatively low in magnitude in regard to their impact on population size. For Canada as a whole the in-migration ratio for urban areas (rural-to-urban five-year migration) does not exceed four per cent. This means that less than four per cent of the Canadian reporting urban population aged five and over in 1961 consisted of persons who resided in rural areas (as of 1961) in 1956. The impact of the urban-to-rural five-year migration on the 1956 urban population has also been relatively small. The out-migration ratio for all urban areas in Canada fails to exceed five per cent. A similar pattern of low impact of urban-rural migration upon *urban* population is shown among the provinces for the intra-provincial migrants. It may be concluded that the impact *upon urban population* of the rural-to-urban or the urban-to-rural migration was rather small in the 1956 - 61 period. *The significant volumes of five-year migration involving urban areas were inter-urban.*

However, the flows of five-year migration into and out of rural areas significantly affected rural population. The rural non-farm areas had high in-migration ratios and low out-migration ratios. For example, in Canada as a whole 19 per cent of the 1961 rural non-farm reporting population consisted of persons who resided either in rural farm or in urban areas on June 1, 1956.[15] The rural farm areas had high out-migration ratios and low in-migration ratios. For example, in Canada as a whole 18 per cent of the approximate exposed 1956 population of rural farm areas resided in either rural non-farm or urban areas in 1961. Similar patterns are shown in Table 2.6 for intra-provincial migrants in the various provinces.

Table 2.5 indicates that in the 1956 - 61 five-year migration *within* Canada there was a very low net migration loss to urban areas[16] (taken as a whole) and a corresponding net migration gain to rural areas. The differential

Table 2.6 – Five-Year Internal Migration Ratios by Urban, Rural Non-farm and Rural Farm, by Sex, Canada and Provinces, 1956-61

Item and province	Males			Females		
	Urban[a]	Rural non-farm[b]	Rural farm[b]	Urban[a]	Rural non-farm[b]	Rural farm[b]
Canada[c]						
In-migration ratio[d]	3.7	18.6	6.6	3.8	19.3	7.1
Out-migration ratio[d]	4.5	7.4	17.8	4.2	8.2	20.6
Net migration ratio[d]	– 0.8	12.1	– 13.7	– 0.4	12.0	– 17.0
	Intra-provincial migration only					
In-migration ratio –						
Newfoundland	3.4	6.5	e	4.4	7.6	e
Prince Edward Island ..	7.3	7.3	3.0	8.2	7.8	5.2
Nova Scotia	2.8	10.9	3.3	3.1	11.8	3.9
New Brunswick	3.8	8.6	2.7	4.4	9.7	3.3
Quebec	2.4	11.7	3.6	2.6	12.5	4.2
Ontario	2.2	21.9	9.1	2.2	22.2	9.6
Manitoba	4.8	12.2	4.4	5.0	12.6	4.9
Saskatchewan	11.2	11.3	3.7	11.3	12.5	4.3
Alberta	5.7	17.9	7.0	6.0	18.9	7.7
British Columbia	2.5	24.6	10.9	2.6	25.2	11.6
Out-migration ratio –						
Newfoundland	2.2	0.2	e	2.4	0.3	e
Prince Edward Island...	4.5	6.0	6.4	4.6	8.2	8.3
Nova Scotia	5.5	1.6	22.1	5.5	1.9	26.8
New Brunswick	5.1	1.6	19.8	5.2	2.3	24.2
Quebec	2.3	5.8	11.4	2.2	6.8	14.0
Ontario	4.0	7.5	16.5	3.7	8.2	18.8
Manitoba	2.6	11.3	10.9	2.5	12.6	13.2
Saskatchewan	3.9	13.4	9.7	4.0	14.3	12.3
Alberta	4.6	15.5	11.1	4.3	17.3	13.7
British Columbia	6.3	2.4	38.2	5.8	3.1	40.3
Net migration ratio –						
Newfoundland	1.3	6.3	e	2.1	7.3	e
Prince Edward Island ..	3.0	1.4	– 3.6	3.8	– 0.5	– 3.4
Nova Scotia	– 3.0	9.5	– 24.1	– 2.5	10.1	– 31.2
New Brunswick	– 1.4	7.0	– 21.4	– 0.8	7.6	– 27.6
Quebec	0.2	6.3	– 8.8	0.4	6.1	– 11.3
Ontario	– 1.9	15.6	– 8.9	– 1.5	15.2	– 11.2
Manitoba	2.3	1.0	– 7.4	2.6	0.1	– 9.5
Saskatchewan	7.6	– 2.5	– 6.6	7.6	– 2.1	– 9.1
Alberta	1.2	2.8	– 4.6	1.8	2.0	– 6.9
British Columbia	– 4.0	22.7	– 44.2	– 3.4	22.8	– 48.0

[a] See Table 2.5, footnote [c]. Excludes migrants from other urban centres.

[b] Migrants from rural areas, who failed to report whether their usual place of residence in 1956 was a farm or not, have been distributed among the rural categories.

[c] Exclusive of the Yukon and Northwest Territories.

[d] See Table 2.1, footnote [c].

[e] Data for Newfoundland excluded due to apparent defects in the basic tabulations.

SOURCE: 1961 Census, DBS 98-509, Tables I-1, I-2 and I-3.

is rather small, however, and it may strongly reflect the exclusion of collective households from the 1961 Population Sample, since a tangible (even if small) proportion of migrants from rural areas to big cities tend to live in lodging houses. This point has been suggested by Charbonneau and Légaré (1968). In any event there may have been a significant number of areas in the daily commuting distance to cities which were classified as rural in the 1961 Census only because they failed to meet the 1961 Census density criterion (1,000 persons per square mile was required) for the fringes of cities which could be classified as urban. There may have been significant levels of out-migration of urban residents to these outlying areas (classified as rural) over the 1956-61 period; and this observation is supported by the very high five-year net migration ratio shown for the rural non-farm areas (Table 2.5). Among persons aged five and over in 1961, for example, the rural non-farm net migration ratio was 12 per cent, a very high figure for a five-year period. The rural farm net migration ratio was *minus* 13 per cent.

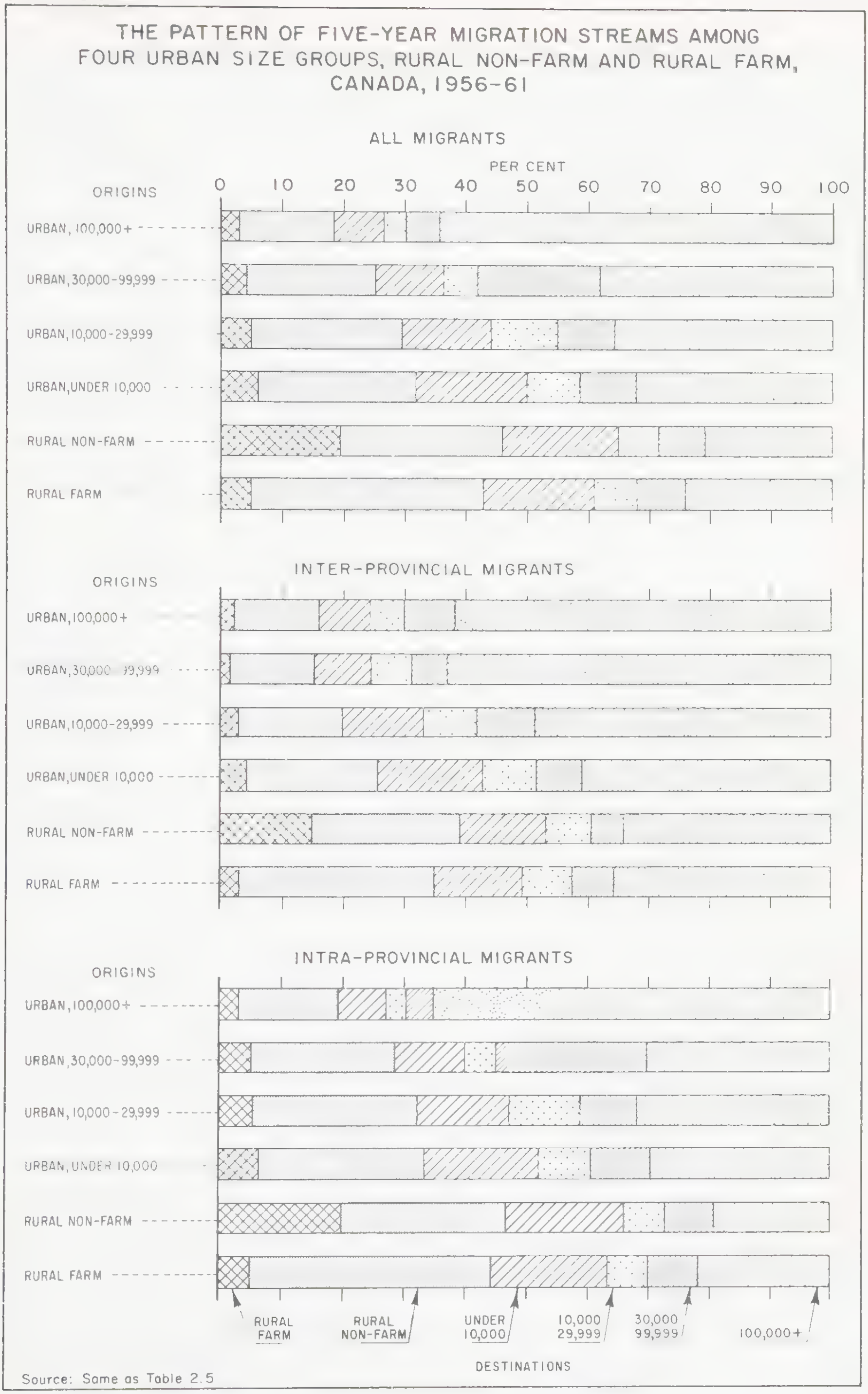
Table 2.5 also shows a positive association between urban size and the 1956-61 net internal migration ratio. This finding is consistent with that shown by Stone (1967 [a]) for all persons in the 1951-61 decade. These consistent patterns show that in recent years the retentive power of an urban agglomeration upon population varied directly with its size.

Table 2.6 shows the urban-rural differentials in the 1956-61 five-year net migration ratio for the migrants who did *not* cross provincial boundaries.[17] The pattern of positive net migration ratios for the rural non-farm category and negative net migration ratios for the urban and rural farm categories, which was shown above for Canada taken as a whole, is shown only by Nova Scotia, New Brunswick, Ontario and British Columbia. For all the remaining provinces the urban net migration ratio is positive. In the case of Saskatchewan both the rural non-farm and the rural farm categories show negative net migration ratios.

2.3.3 STREAMS AMONG URBAN SIZE GROUPS AND RURAL CATEGORIES — Among the four selected urban size groups and the rural non-farm and rural farm groups, none failed to receive some five-year migrants from each of the others (Chart 2.6) and none failed to send some five-year migrants to each of the other types. Thus the data show some migration even from the urban size group of 100,000 and over *to* the rural farm areas, although this migration stream was very small compared to the total volume of out-migration from the urban size group of 100,000 and over.

As one might expect, the urban areas comprised a much more prominent destination for five-year migrants than did rural areas. Out-migrants from urban areas overwhelmingly chose other urban areas for their destination

CHART-2.6



Source: Same as Table 2.5

and most of the out-migrants from rural areas went to urban areas. The predominance of the urban areas as destinations for the five-year migrants in the 1956-61 period is observed for both inter-provincial and intra-provincial migration. The preference for urban destinations was somewhat sharper among the intra-provincial than among the inter-provincial migrants. Although this preference is to be expected in view of the heavy concentration of Canada's population among urban areas in 1956, its degree exceeds expectations based on the urban share of Canada's population. If the preference for urban destinations corresponds to the urban concentration of population in 1956, roughly 66 per cent[18] of the out-migrants from urban areas would settle in other urban areas. The actual percentages settling in urban areas, for the 1956-61 five-year migrants, were 77 per cent for those originating in urban areas and 56 per cent for those starting in rural areas. The general pattern for rural areas is observed in both the farm and non-farm categories.

If rural-to-urban migration streams comprised a major portion of Canadian internal migration in decades gone by, this is no longer true. Table 2.7 shows clearly that the urban-to-urban streams were very much larger than the rural-to-urban streams in the 1956-61 five-year migration. This statement holds true for both the inter-provincial and the intra-provincial migration. Among the intra-provincial five-year migrants, urban-to-urban migrants outnumbered the rural-to-urban migrants by four to one. Among the inter-provincial migrants, the corresponding ratio was six to one. In contrast, the urban population outnumbered the rural population by at most three to one. Thus it seems clear that the most important (in terms of sheer volume) migrational flows in Canada today are among urban areas.

The urban size group of 100,000 and over includes the metropolitan areas. Chart 2.6 shows that in inter-provincial migration this size group was the most favoured destination of the five-year out-migrants for municipalities in *each* of the six area types selected. Regardless of the urban size group or the rural category of origin, the five-year out-migrants had a clear preference for the urban size group of 100,000 and over. This preference does diminish systematically, however, as one goes down the ladder of urban size groups of origin beginning at 100,000 and over. The preference for the 100,000-plus size group as a destination also diminishes as one goes from the rural non-farm to the rural farm categories.

Among the intra-provincial five-year migrants a preference for the urban size group 100,000 and over as a destination is also shown, but it is strong only for those residing in this size group in 1956. The five-year out-migrants from municipalities in each of the rural area types settled mainly in the rural non-farm destination. This tendency is particularly strong among the five-year out-migrants from rural farm areas, 39 per cent of whom settled

in rural non-farm areas in contrast to the 22 per cent in the 100,000-plus urban size group. These comparisons do not mean that a majority of intra-provincial five-year migrants from rural areas went to other rural areas; they went mainly to urban areas but they did choose rural non-farm over the urban size group of 100,000-plus as destinations.

Table 2.7 – Relative Sizes of the Five-Year Migration Stream Among Urban Size Groups, Rural Non-farm and Rural Farm, Canada, 1956-61

NOTE. — Each stream (a group of persons living in one type of area in 1961 but who resided in *another* type in 1956) is expressed as a percentage of the aggregate of all streams. For example, the first row shows that, of all streams among the six different area types, 58.5 per cent were urban-to-urban five-year migrants. The second row shows that 27.6 per cent were five-year migrants between urban centres of 100,000 and over.

Type of residence in 1961	Type of residence in 1956							
	Urban					Rural[a]		
	All urban	100,000 and over	30,000 - 99,999	10,000 - 29,999	Under 10,000	All rural	Non-farm	Farm
Urban[b]	58.5	34.9	6.1	5.7	11.6	13.3	4.9	8.4
100,000 and over	39.2	27.6[c]	3.1	2.9	5.5	5.4	1.9	3.5
30,000 - 99,999	6.3	2.3	1.6	0.8	1.6	1.9	0.7	1.2
10,000 - 29,999	4.4	1.6	0.4	0.9	1.5	1.6	0.6	1.0
Under 10,000	8.6	3.4	0.9	1.2	3.1	4.4	1.7	2.7
Rural	17.8	7.9	2.1	2.4	5.4	10.5	4.1	6.3
Non-farm	14.8	6.7	1.7	2.0	4.4	8.0	2.4	5.6
Farm	3.0	1.2	0.3	0.4	1.0	2.5	1.8	0.7

[a] Migrants from rural areas, who failed to report whether their usual place of residence in 1956 was a farm or not, have been distributed among the rural categories.

[b] See Table 2.5, footnote [c].

[c] An analysis of the basic tabulations suggests that the data shown for intra-provincial flows among centres of 100,000 or more include persons crossing municipal boundaries *within* a given agglomeration of 100,000 and over.

SOURCE: Same as Table 2.5.

Striking features of the data shown in Chart 2.6 are the very small percentages of five-year migrants moving *into* farm areas. In all cases except rural non-farm areas, the percentage of out-migrants going to rural farm areas failed to reach 10 per cent. This statement holds true for both the inter-provincial and the intra-provincial migration streams.

For the inter-provincial five-year migration, most of the migration streams among the six area types shown in Chart 2.6 failed to exceed one per cent of the average of the populations at origin and destination. The only exception among the inter-provincial streams is that in which the urban size group of 100,000 and over is both origin and destination, as Table 2.8 shows.

Table 2.8 – Intensity of Five-Year Migration Streams Among Urban Size Groups, Rural Non-farm and Rural Farm, Canada, 1956-61

NOTE. – See headnote to Table 2.7, for the definition of "stream". As a measure of intensity, each stream is divided by the average of the 1956 population at origin and the 1961 population at destination, and the resulting ratio is expressed as a percentage. This denominator refers to the actual census-enumerated population.

Type of residence in 1961	Type of residence in 1956							
	Urban					Rural[a]		
	All urban	100,000 and over	30,000 - 99,999	10,000 - 29,999	Under 10,000	All rural	Non-farm	Farm
	Inter-provincial migration							
Urban[b]	3.1	2.2	0.7	0.7	1.0	0.7	0.2	0.6
100,000 and over . .	2.6	2.1	0.8	0.6	0.8	0.5	0.2	0.5
30,000 - 99,999 . . .	0.6	0.5	0.2	0.4	0.4	0.2	0.1	0.2
10,000 - 29,999 . . .	0.5	0.3	0.3	0.5	0.6	0.2	0.1	0.3
Under 10,000	0.7	0.4	0.3	0.5	0.8	0.4	0.2	0.4
Rural[b]	1.0	0.6	0.2	0.4	0.7	0.7	0.3	0.6
Non-farm	1.0	0.7	0.3	0.5	0.8	0.7	0.2	0.8
Farm	0.2	0.1	0.0	0.1	0.2	0.2	0.2	0.1
	Intra-provincial migration							
Urban[b]	10.3	7.7	1.8	1.8	3.4	3.3	1.5	2.4
100,000 and over . .	8.5	8.1[c]	1.1	1.3	2.2	1.7	0.8	1.4
30,000 - 99,999 . . .	2.0	0.9	2.7	1.3	1.9	1.2	0.7	1.2
10,000 - 29,999 . . .	1.4	0.8	0.7	2.2	2.0	1.1	0.7	1.2
Under 10,000	2.7	1.6	1.2	1.9	3.3	2.7	1.7	2.6
Rural[b]	4.8	2.9	1.4	1.8	3.3	4.5	2.5	3.6
Non-farm	4.5	2.9	1.7	2.2	3.6	4.1	1.9	4.2
Farm	1.0	0.6	0.5	0.7	1.2	1.6	1.7	0.7

[a] Migrants from rural areas who failed to report whether their usual place of residence in 1956 was a farm or not, have been distributed among the rural categories.

[b] See Table 2.5, footnote[c].

[c] See Table 2.7, footnote[c].

SOURCE: Same as Table 2.5.

Among the intra-provincial five-year migrants, however, several streams exceeded one per cent of the average of the population at origin and destination. This difference between the inter-provincial and the intra-provincial migration is the result of the very much larger number of migrants involved in intra-provincial migration. For the 1956-61 period, intra-provincial five-

year migrants outnumbered the inter-provincial five-year migrants by four to one (1961 Census, DBS 98-509, Tables I-2 and I-3). Table 2.8 shows that only in the case of the rural farm *destination* was there a conspicuous absence of intra-provincial streams which exceeded by at least one per cent the average populations at origin and destination.

Table 2.9 – Distribution of Counties or Census Divisions Among Levels of the Net Migration Ratio,[a] Canada, 1951-61

Counties or census divisions	All areas	Net migration ratio levels		
		Five per cent or less	Six to 19 per cent	20 per cent and over
	Number of areas			
Those containing or adjacent to 1961 Census MAs or MUAs[b] ...	52	16	17	19
Others containing urban centres of at least 10,000 population in 1921	12	9	3	–
Others where 1931 rural population was at least 50 per cent in farming	140	128	10	2
Remaining areas	15	9	–	6
All counties or census divisions . .	219	162	30	27
	Per cent of areas			
Those containing or adjacent to 1961 Census MAs or MUAs[b] ...	100.0	30.8	32.7	36.5
Others containing urban centres of at least 10,000 population in 1921	100.0	75.0	25.0	–
Others where 1931 rural population was at least 50 per cent in farming	100.0	91.4	7.2	1.4
Remaining areas	100.0	60.0	–	40.0
All counties or census divisions	100.0	74.0	13.7	12.3

[a] See Table 2.4, footnotes [a] and [b] for the relevant definitions.

[b] "MA" means Census Metropolitan Area and "MUA" means Census Major Urban Area; for the definitions see 1961 Census, DBS 99-512, pp. 2.1-2.3.

SOURCES: 1931 Census, Vol. I, Table 116; 1961 Census, DBS 92-539, Table 6; 1961 Census, DBS 99-511, Table 2.

The relevant historical data (cf. Buckley, 1963, p. 18; Anderson, 1966, ch. 3; and Stone, 1967[a], ch. 5) and the patterns in Tables 2.5 to 2.8 again indicate that Canada has already entered upon a new stage in regard to the prominence of rural-urban migration streams. Through the nineteenth century

and the early part of the twentieth century, the rural-to-urban migration streams, taken together, probably comprised the most significant volume of Canadian internal migration. The 1961 Population Sample strongly suggests that this statement no longer holds true in Canada. For the future the most significant internal migration streams will be among urban centres, and the streams involving the large urban agglomerations and metropolitan areas will be particularly important (Stone, 1967[a], ch. 6). Before another generation is passed the contribution of rural population to urban population growth in each intercensal period will probably be almost negligible. Of course this does not mean that the growth performances of individual urban centres and their shares in the inter-urban migration streams will not pose significant problems in particular Canadian regions.

The significance of the locations of the larger urban agglomerations and metropolitan areas for the current and future patterns of Canadian migration streams is suggested by Table 2.9. In this table, 219 counties or census divisions are classified according to 1951-61 net migration ratio level.[19] The 52 counties or census divisions containing or surrounding the 1961 Census Metropolitan or Major Urban Areas show by far the highest concentrations among decennial net migration ratios higher than six per cent or 20 per cent. These data suggest that at the county level the presence of a large urban agglomeration or metropolitan area significantly affects a region's retentive power upon population (see Chapter Eight for further data on this point).

2.4 INTERNAL MIGRATION TRENDS

The foregoing Sections concentrate upon areal differentials in migration; this Section considers the temporal pattern of Canadian migration. Aside from its intrinsic interest, this consideration is important because it leads to questions about the demographic reflections and factors of major economic trends and fluctuations in Canada.

Unfortunately, the available statistics provide, at best, a partial reflection of the true historical trend and fluctuations in the inter-regional migration rates for Canada. This fact is a result of the openness of Canada to external migration. The historical migration data for provinces, for example, reflect both internal and the external migrations and it is difficult to identify reliably the internal and external components of these statistics. Thus, from the available historical data, it is difficult to provide a reliable answer to the question as to whether, as might be suspected, marked fluctuations in Canadian economic growth are reflected by swings in the level of internal migration.

To the above-mentioned question Buckley, 1963, pp. 18-21, does suggest a positive answer, if the United States may be considered as one of the 'regions' for Canadian migrations. Adding the native Canadians residing in the United States to the Canadian-born residents living outside their province of birth, at each census, he finds a tendency toward concordance between long swings in Canadian economic growth and historical fluctuations in the migration of native Canadians.

Sinclair has attempted to develop *internal* migration estimates through the assumption that the rate of net external migration is the same for each province (Sinclair, 1966, pp. 39-52). On the basis of this assumption he derives an index of the over-all level of inter-provincial migration in each decade from 1871 to 1951. He finds that there are large variations in the estimated level of net internal migration from one decade to another and that these variations are positively associated with swings in Canadian economic growth.

Data on fluctuations in the rate of Canadian urbanization are probably markedly associated with swings in the level of internal migration. Measuring urbanization as the per cent of population residing in urban areas, it is easily shown that fluctuations in the rate of urbanization are not significantly explained by fluctuations in birth rates. This is so because, in Canada as a whole, urban and rural areas have shown roughly similar patterns of historical fluctuation in birth rates (cf. Slater, 1960, pp. 82-88). Thus, internal migration must be a major factor in the historical fluctuations in the level of Canadian urbanization.

Stone (1967[a], Table 2.2) shows that the decennial rate of advance in Canadian urbanization was markedly below the average (for 1851-1961) mainly in the periods before Confederation and in the intercensal period which contained most of the Great Depression (1931-41). The rate of advance in Canadian urbanization accelerated markedly in the decade following Confederation and again in the period following World War II. The peak decennial advances in the level of Canadian urbanization were attained in 1901-11, 1941-51 and 1951-61. The author (Stone, 1967[a], ch. 2) has roughly associated the historical pattern of advances in urbanization with some major and well-known developments in the economic history of Canada. It seems safe to assume that pattern of advances in the level of Canadian urbanization is markedly correlated with that in the level of internal migration. Sinclair's (1966, pp. 87-94) analysis suggests that this assumption is correct.

The foregoing comments are also confirmed by a review of estimates by Slater, 1960. and Anderson, 1966, of net migration for all urban areas

(taken together) in Canada. It is well known that the volume of internal migration (counting in-migration only) in Canada was very much larger than the volume of immigration to Canada. Much of this internal migration was intra-provincial and rural-to-urban, although the rural-urban streams showed diminishing volume. These observations suggest that the historical pattern of net migration ratios for all urban areas in Canada probably reflect historical fluctuations in the level of internal migration. Slater's estimates (Slater 1960, Table B.3) begin with 1891 - 1901, and they show a sharp rise in the level of the crude net migration ratio to urban areas between 1891 - 1901 and 1901 - 11. This ratio then declines gradually in each decade to a trough in 1931 - 41, after which decade it rises again. Anderson's (1966, Table 16) estimates begin in 1921 - 31 and they show a marked fall in the level of the net migration ratio to urban areas between 1921 - 31 and 1931 - 41. The ratio then rises in 1941 - 51 and again in 1951 - 61. This general historical pattern is, not surprisingly, markedly associated with the pattern of decennial advances in the level of Canadian urbanization (Stone, 1967[a], Table 2.2).

Thus, assuming that the above-mentioned data for urban areas and urbanization reflect the historical pattern of fluctuations in the level of internal migration, Sinclair's main conclusion in this connection may be concerned with. The level of intercensal internal (at least inter-provincial and rural-urban) migration in Canada probably has *not* shown any marked upward or downward trend since the mid-nineteenth century. However, in concordance with the very marked downturn of economic growth and structural change occasioned by the Great Depression, the level of internal migration did reach a distinct trough in 1931 - 41 following its peak in 1901 - 11. Since 1931 - 41 the level of inter-regional migration in Canada has probably increased markedly.

2.5 MOBILITY OF THE CANADIAN POPULATION, 1956-61

As mentioned above, the data on mobility are influenced markedly by the numbers of persons who change their home without changing their local community of residence. Such persons are not migrants in the sense set forth in Section 1.4. Moreover their moves are much more influenced by individual and family life cycle changes rather than by conditions in the local community of residence or in other communities. These intra-municipal moves are not quite relevant to the main focus of this monograph. However, it is appropriate to discuss briefly the mobility of the Canadian population in this introductory review.

The Canadian population appears to be highly mobile. Among the persons aged five and over in 1961 who were residents of family-type households, some 44 per cent changed their residence *within* Canada *at*

least once between June 1, 1956 and June 1, 1961. This is close to one half of the 1961 population mentioned above.

Table 2.10 – Five-Year Internal Mobility Ratios[a] for the Reporting Population,[b] by Sex, Canada and Provinces, 1956-61

Provinces	Total	Male	Female	Total	Male	Female
	All areas			Urban		
Canada[c]	**43.7**	**43.4**	**44.0**	**49.7**	**49.9**	**49.5**
Newfoundland	27.2	26.3	28.3	33.4	32.4	34.4
Prince Edward Island	28.3	27.2	29.3	43.5	43.4	43.5
Nova Scotia	33.4	32.7	34.1	39.5	39.2	39.9
New Brunswick	32.9	32.0	33.7	43.6	43.5	43.7
Quebec	43.4	43.0	43.8	50.3	50.3	50.2
Ontario	45.3	45.4	45.2	48.6	49.0	48.2
Manitoba	42.3	41.7	42.8	50.1	50.3	49.9
Saskatchewan	38.9	38.0	39.9	55.5	55.9	55.0
Alberta	50.5	49.9	51.2	60.3	60.6	60.0
British Columbia	51.0	50.9	51.1	51.2	51.2	51.2
	Rural non-farm[d]			Rural farm[d]		
Canada[c]	**39.0**	**38.8**	**39.2**	**16.6**	**16.3**	**17.1**
Newfoundland	21.4	20.8	22.1	14.6	13.6	15.7
Prince Edward Island	30.2	30.0	30.5	12.5	11.6	13.5
Nova Scotia	29.4	28.9	29.9	11.4	10.8	12.2
New Brunswick	27.0	26.4	27.7	11.1	10.6	11.6
Quebec	34.1	33.8	34.5	10.8	10.5	11.1
Ontario	44.5	44.5	44.4	18.0	17.8	18.3
Manitoba	42.0	42.0	42.1	17.4	16.9	18.0
Saskatchewan	41.9	41.9	41.9	16.7	16.1	17.4
Alberta	50.6	50.6	50.5	23.9	23.4	24.5
British Columbia	54.7	54.5	54.9	32.0	31.7	32.2

[a] The mobility ratio is 100 (all movers, including intra-municipal/reporting population).
[b] The reporting population is defined in Table 2.1, footnote [b].
[c] Exclusive of the Yukon and Northwest Territories.
[d] Migrants from rural areas who failed to report whether their usual place of residence in 1956 was a farm or not have been distributed among the rural categories.

SOURCE: 1961 Census, DBS 98-509, Table I-1.

Table 2.10 shows that for Canada as a whole and in each province the urban mobility ratio was much higher than the rural one in the 1956-61 five-year mobility. In Canada as a whole the mobility ratio for urban population was almost 20 percentage points higher than that for rural population (50 per cent versus 30 per cent). This strong rural-urban differential in the 1956-61 mobility ratio results from at least two factors. Firstly, the heavy

movement from rural farm to urban areas depletes the number of movers in the 1961 rural category and adds to the number in the urban category. Secondly, on the average, rural dwellings and their surroundings may more easily be adapted to the exigencies of change in the family life cycle than urban ones, so that these changes may set up fewer forces pushing up demand for new accommodations in rural than in urban areas. Because of the first factor, it should be clear that the mobility ratio as measured here does not necessarily show the urban population to be more mobile than the rural one. In order to show this effectively, it would be necessary to consider the 1956-61 mobility of the 1956 rural population as against that of the 1956 urban population.

Among the two rural categories, mobility ratios were much higher for rural non-farm population than for rural farm population. In some provinces (notably Ontario and British Columbia) the 1956-61 mobility ratio for the rural non-farm population was close to or higher than that for the urban population (Table 2.10).

Table 2.11 – Five-Year Internal Mobility Ratios[a] by Urban Size Group, Canada, 1956-61

Sex and age	Urban total[b]	100,000 and over	30,000 - 99,999	10,000 - 29,999	Under 10,000	Rural non-farm[c]	Rural farm[c]
Age five and over[d]	49.7	52.0	46.9	47.3	43.7	39.0	16.6
Males	49.9	52.3	47.1	47.5	43.9	38.8	16.3
Females	49.5	51.8	46.6	47.1	43.5	39.2	17.1
Age 20-24	69.0	70.5	67.3	68.3	64.6	59.7	29.0
Males	62.4	64.0	60.9	62.0	56.7	49.8	20.2
Females	75.1	76.3	73.1	74.0	71.9	69.3	42.9
Age 25-29	78.2	79.7	76.2	77.0	73.6	65.9	34.6
Males	79.6	80.7	78.2	79.2	76.1	67.5	31.9
Females	76.8	78.8	74.4	74.8	71.0	64.3	37.8
Age 30-34	66.7	68.9	62.9	64.1	60.9	54.1	26.2
Males	70.4	72.5	67.0	67.8	65.4	58.0	27.5
Females	63.0	65.4	58.8	60.5	56.4	50.0	24.8

[a] See Table 2.10, footnote [a].
[b] See Table 2.5, footnote [c].
[c] Migrants from rural areas, who failed to report whether their usual place of residence in 1956 was a farm or not, have been distributed among the rural categories.
[d] See Table 2.1, footnote [b].

SOURCE: Same as Table 2.5.

A roughly positive association between urban size group and the 1956-61 mobility ratio is shown for Canada as a whole (Table 2.11). The mobility ratio for the size group of 100,000 and over is roughly five percentage points

higher than that for the 10,000 - 29,999 size group. The mobility ratio for the 10,000 - 29,999 size group is roughly eight percentage points higher than that of the rural non-farm population. Thus, as one moves from the rural farm to the rural non-farm categories and from the latter up through the urban size groups, the 1956 - 61 mobility ratio tends to increase. A similar pattern of urban-rural differentials is shown by Table 2.10 for the 10 provinces. Again, it should be recalled that these ratios are based on the 1961 populations in their 1961 areas of residence and thus tend to favour areas of high net in-migration. Different patterns might be observed if the migrants were allocated back to their areas of origin and ratios were based on the 1956 populations of these areas.

As the foregoing discussion would suggest, the more highly urbanized provinces show the higher 1956 - 61 mobility ratios. Alberta and British Columbia showed 1956 - 61 mobility ratios somewhat above 50 per cent and the corresponding figures for Quebec, Ontario and Manitoba were between 40 and 45 per cent. Although it is one of the least urbanized provinces, Saskatchewan had a 1956 - 61 mobility ratio close to 40 per cent; those for the Atlantic provinces were much below the 40 per cent level.

Table 2.12 – Distribution of Five-Year Movers Among Selected Movement Categories, by Sex, Canada, 1956 - 61

Area	Total[a]	Intra-municipal	Inter-municipal		
			Intra-provincial	Inter-provincial	
				Contiguous province	Non-contiguous province
	Males				
Canada	**100.0**	**60.0**	**31.7**	**4.3**	**3.9**
Urban	100.0	63.5	28.2	4.3	3.9
Rural non-farm	100.0	46.0	45.0	4.5	4.4
Rural farm	100.0	53.0	40.9	3.6	2.5
	Females				
Canada	**100.0**	**59.7**	**32.2**	**4.3**	**3.8**
Urban	100.0	63.3	28.7	4.2	3.8
Rural non-farm	100.0	44.6	46.5	4.5	4.3
Rural farm	100.0	50.8	43.8	3.4	2.1

[a] Rows may not add to the total due to rounding error.

SOURCE: Same as Table 2.10.

Generally, distance tends to impede mobility. As distance increases so does the cost of moving. Also, the greater the distance covered in moving the greater tends to be the break with social ties in the community of origin and the less is the flow of information from the potential destination. Table 2.12 shows differentials which support the notion that distance impedes movement. For Canada as a whole, the rank ordering to the types of move according to their share of the total moves (from highest to lowest) is as follows: intra-municipal movers, intra-provincial migrants, inter-provincial migrants to contiguous provinces, and inter-provincial migrants to non-contiguous provinces. This rank ordering is observed among the urban, rural non-farm and rural farm categories for Canada as a whole and is also shown by each province. These findings indicate strongly that distance must be taken into account when attempt is made to explain differentials in the volumes of streams of movers or migrants between specific origins and destinations.

2.6 SUMMARY

The openness of Canada to international migration is one of the striking facts of its history. From 1851 to 1961 over 8,000,000 immigrants came to Canada, a figure slightly more than one third of the total number of births taking place in Canada over the same period. The offspring and descendants of immigrants no doubt figured prominently in the births, and this must be considered in assessing the impact of external migration on the Canadian population growth. The direct impact of this external migration was unimpressive because over 6,000,000 emigrants left Canada in the 1851 - 1961 period. The flows of immigrants and emigrants showed prominent waves over the decades but since the Second World War decennial emigration ratios have remained fairly stable at low values while the decennial immigration ratios have shown a marked upward trend.

The total external migration is a summation of specific migration streams between individual provinces and other countries. As destinations (and probably as origins too) of these streams since 1921, the most prominent provinces were Ontario, Quebec, British Columbia and Alberta. If the pertinent statistics were available back to 1901, the Prairie Provinces would probably be more evident in such a list for the first three censuses in this century.

The streams of migration flowing within Canada dwarfed in volume those flowing into or out of Canada. Among the provinces, Ontario, Quebec, Alberta and British Columbia made the largest contributions to the volume of internal migration, which is to be expected since these are the largest provinces. When population size is partially controlled by the calculation of

appropriate ratios, the highest values on inter-provincial migration are observed for the western provinces and Prince Edward Island. Generally, British Columbia and Alberta led on the 1956-61 in-migration ratio, while Saskatchewan and Manitoba had the highest 1956-61 out-migration ratios.

In the only other period for which census data were gathered on inter-provincial migration flows, the gross migration ratios were distinctly higher in Western Canada than elsewhere. These high ratios resulted in large part from the very heavy outflows from the Prairies which were particularly hard hit by the Great Depression.

Actually, there is a definite pattern of historical shifts in the identities of the major origins and destinations of Canadian migration. In the latter part of the nineteenth century the major origins were in Eastern Canada, and the major destinations in the United States. In the early decades of the present century there were heavy streams of migration into the Prairies, while in the more recent decades Ontario, Quebec and British Columbia tended to be the major provincial destinations of migration streams.

The specific migration streams flowing among the various provincial origins and destinations show distinct features. Ontario is the favourite destination for out-migrants from the provinces to the east of it. For these provinces in the eastern half of Canada, the next most favoured destinations also lie in that part of Canada. Thus there were few strong streams which began in Eastern Canada and skipped over Ontario to reach a western province, and more of Ontario's out-migrants went to Quebec than to any other single province. However, a high proportion of Ontario out-migrants moved westward (particularly to British Columbia). Out-migrants from these westerly provinces mainly chose other western provinces as their most favoured destinations, the only exception being Manitoba (from which the most favoured provincial destination was Ontario). Generally, the most favoured provincial destination for persons originating in the west was a contiguous province, and there were no strong streams originating in the west and ending east of Ontario. Ontario figured prominently as a second most favoured destination for the out-migrants from even non-contiguous western provinces, particularly British Columbia. Thus Ontario became a sort of 'buffer zone' inhibiting strong flows between the eastern and western regions of Canada, although there were strong flows within these regions and with Ontario.

The inter-provincial flows generated net shifts in population at each province (net migration). These net shifts were almost persistently positive for Ontario and British Columbia and negative for the Maritimes. The Prairies had very high positive net shifts in the early decades of the present

century, and prominent negative shifts in the relatively depressed 1931 - 41 decade. Since that decade, Alberta has joined Ontario and British Columbia as the three provinces with marked positive net migration ratios. Quebec's net shifts were rather low in the present century, after being high negative in the latter third of the nineteenth century. It is notable that the pattern of persistent differentials in net migration markedly resembles that in income differentials, appearing to confirm the expectation of links between provincial migration flows and economic opportunity.

Rural-urban flows were dwarfed by urban-urban flows in the 1956 - 61 period. This statement holds even when the larger size of the urban population is taken into account, through the calculation of migration ratios. The rural-urban flows had a minor impact on the urban population, but this was not true for the rural population. The rural non-farm population had high in-migration ratios while the rural farm population had high out-migration ratios. For the reporting population, these flows generated a net internal migration loss for the urban and rural farm areas and a net gain for the rural non-farm area in Canada as a whole. Among the streams between four urban size groups and two rural categories, the most prominent were those involving the 100,000-plus urban size group and this held true even after population size differences were taken into account.

Important questions may be raised about the historical trend and pattern in the level of internal migration in Canada. The evidence available for describing this trend and pattern is fragmentary but suggests that, for Canada as a whole, there has been no definite upward or downward trend in the decennial migration across provincial boundaries since the mid-nineteenth century. However, there have been fluctuations associated with swings in the Canadian economy.

Although this volume is concerned almost entirely with inter-municipal moves, there is some interest in the mobility which reflects changes of residence within the same municipality as well as inter-municipal moves. Canada had a high mobility ratio from the 1956 - 61 five-year moves. Among the reporting population in 1961, some 44 per cent had lived in a different house five years before. The corresponding ratios for the urban and rural populations were 50 per cent and 30 per cent, respectively. Furthermore, the ratio tends to increase with the size of urban place, as judged by broad urban size group statistics. Finally, distance impedes mobility (as is well known), for the intra-municipal movers greatly exceed the intra-provincial (inter-municipal) migrants, who in turn greatly exceed the inter-provincial migrants.

FOOTNOTES TO CHAPTER TWO

[1] In the process of aging in our society a person goes through certain phases of development which may be said to comprise a life cycle. Well known are the passages from infancy, to childhood, to young adulthood, to maturity and to old age. Each phase tends to be accompanied by important events such as schooling, work, marriage, birth of children, maturation of children, etc. With the onset of such events the individual may be said to have entered upon a new stage in his life cycle.

A family also has a life cycle comprising a sequence of major events from its formation to its dissolution. These events involve the birth and maturation of children, divorce, death of spouse, etc.

[2] An area that can be entered or left by migration is said to be open.

[3] Throughout this monograph international migrants are referred to as immigrants or as emigrants. For a given country, immigrants are the persons *entering* it while emigrants are those *leaving* it. When reference is not specifically to international migrants, the terms "migrant", "in-migrant" or "out-migrant" are used as required.

As the term "net migration" is often used, it is perhaps worth noting that it does not refer to individuals – that is, there is no such thing as a net migrant. Net migration is a purely mathematical concept referring to a net shift in population *size* defined as in-migrants *minus* out-migrants.

[4] The "gross migration" for an area is defined here as the sum of in-migrants and out-migrants; it is a reflection of the amount of population turnover in the area.

[5] See the discussion on the concept of *five-year migration* in Appendix B. It should be recalled from that discussion that the data do *not* reflect multiple or return migration by the same person over the 1956-61 reference period, and that the *universe* of the Population Sample refers generally to the private household population (about 96 per cent of the total population in 1961) aged five and over in 1961. For convenience this is termed the "reporting population".

[6] It is important to recall, however, that the in-migrants present at the 1961 Census only partially reflect the true volume of in-migration, even if the Population Sample estimate of in-migrants is accurate. As noted in Appendix B, multiple and return migration are not counted. In-migrants who die before the census or who leave Canada after in-migrating (and before the 1961 Census) are also missed.

Furthermore, the in-migration ratio is an imperfect reflection of the true in-migration rate for other reasons. The base of this ratio is the population size in 1961, a figure influenced by deaths and by out-migration from the 1956 population. For example, if a large proportion of an area's 1956 population out-migrates or dies, the area may show a high in-migration ratio (as calculated) even with a manifestly small number of in-migrants. The high in-migration ratio may thus be a poor reflection of the attraction of the place for potential migrants.

Similar difficulties are observed with the out-migration ratio, whose base is the 1961 population minus sample-estimated net migration. This operation has the effect of subtracting out (from the 1961 population) the estimated in-migrants and adding back the estimated out-migrants (who were indeed in the 1956 population). But there are other elements missing from this reconstruction of the 1956 population

exposed to migration (even assuming that the census statistics are correct) — out-migrants who die or who leave the country before the 1961 Census. Of course, these dead persons and emigrants are also incorrectly missing from the numerator of the out-migration ratio.

It is assumed that, for the most part, the calculated ratios provide fair reflections of *areal differentials* in true rates of in- and out-migration.

[7] It is difficult to give generally accepted limits for the values of the five-year migration ratios which may be considered high, moderate or low. However, the following comments may be relevant. If the five-year in-migration ratio is X per cent we may consider that its 10-year equivalent is slightly *less* than 2X per cent (it is less due to expected return migration by some of the five-year migrants). If we would consider 2X per cent alteration in the population size significant after 10 years, the in-migration ratio may be considered to be substantively significant in the event that the out-migration is zero. Similar considerations may be made for the out-migration and net migration ratios. Essentially, the idea is to consider whether the implied contribution of the migration to population growth would be significant. For example, most people would consider significant a 10 per cent alteration in population size after 10 years — something *near* a one per cent alteration in each year.

[8] The figures mentioned in this paragraph were calculated from the unpublished Population Sample tabulations.

[9] Many of the tables in this monograph focus on this age range, with the upper limit sometimes extended to age 39 or to age 44. It is the age range of peak migration rates, and one marked by high rates of family formation and labour force entry, and by the early years of working life.

[10] The numerator of this ratio is in-migrants *minus* out-migrants and the base is the reporting population in 1961. See footnote [6] for relevant comments.

[11] No economic determinism is intended here. Attention is called to the economic correlates (even though some of the correlations may be 'spurious') which, in accordance with the aims of this volume, emphasize this point of view.

[12] The vital statistics estimate of net migration is population change minus natural increase. Natural increase is births minus deaths. For comments on relevant details of estimation for the periods when vital statistics were not tabulated by place of residence (see Stone, 1967[a], Appendix H).

[13] The use of "inter-provincial" here is made on the assumption that the provincial net migration levels that reflect both internal and external migration are highly correlated with those reflecting internal migration only.

[14] See Appendix C for explanation of the survival ratio estimation.

[15] The identification of rural farm areas is as of 1961.

[16] The identification of urban areas is as of 1961.

[17] The basic tabulations do not permit the calculation of net inter-provincial migration for the urban and rural parts of individual provinces. For example, the tabulations can indicate the number of in-migrants to Ontario from rural farm areas (as of 1961) in other provinces, but the individual contributions of the *other* provinces to these in-migrants are not shown by the tables. Thus, only at the national level may the inter-provincial net migration to urban or to rural areas be shown.

[18] The 66 per cent represents the percentage of urban population in 1956. See 1961 Census, DBS 99-512, Table IV.

[19] Both internal and external migration are reflected in these ratios.

[a] *Urban Development in Canada,* Stone, 1967, Queen's Printer, Cat. No. 99-542/1967.

Chapter Three

SOME GROUP DIFFERENTIALS IN CANADIAN INTERNAL MIGRATION

Chapter Two presents a general review of some spatial and temporal dimensions of Canadian migration. Another important aspect of this migration is comprised of the differentials regarding migration rates among subgroups of the population at a given locality, and a whole monograph may be focused entirely on group differentials in Canadian migration. However, this volume will not carry a heavy emphasis on this subject matter (see the companion volume), but some background information is provided in this Chapter, particularly the type that will alert the reader to the relevance of group differentials in the analysis of the areal pattern of migration.

In the following discussion only moderate emphasis is placed on the demographic migration differentials, as these will be taken up in the companion volume. The emphasis here is mainly on social and economic characteristics of migrants. Although the exposition is largely descriptive it should be of particular interest since the 1961 Census marks the first time that many of these social and economic characteristics of migrants have been measured for a sample as large as roughly 20 per cent of Canada's population.

A fundamental difficulty seriously limits the kinds of interpretation that can be legitimately made from the census data on group differentials in Canadian migration, and it is essential that this difficulty be stated clearly at the outset (see Appendix B for further details). The characteristics of migrants are ascertained at the *end* of the migration interval (June 1, 1956 – June 1, 1961) and not at the time of migration. This circumstance creates no problem for those characteristics that remain constant for each person throughout the migration interval (sex, for example), and it creates a definite but partly manageable problem for those that change in a fixed way and degree for each person (age, for example). But it creates a serious problem for those individual characteristics that may change after June 1, 1956 and do so in a manner or degree that is variable (so that one cannot securely infer how the characteristic appeared in 1956 or

at the time of migration from a knowledge of its nature in 1961). A concrete example in regard to marital status may illustrate the problem.

Marital status is one of the attributes of an individual that may have changed in an unpredictable way over the 1956-61 migration period. For example, the proportion of migrants among all widowed persons in 1961 gives no firm basis for conclusions about the influence of widowhood on the propensity to migrate, because some of the widowed migrants had this marital status throughout the migration period, others migrated before they were widowed, and others were not widowed on June 1, 1956 but became widowed and then migrated. Thus, if the widowed persons show a higher mobility ratio than the married ones (as of 1961) it does not necessarily follow from this evidence alone that being widowed indicates a higher probability of moving than being married. It is essential to be aware of this kind of limitation in using the 1961 Census data on the characteristics of migrants.

However, it may be asked whether selected movement-status groups (non-movers, intra-municipal movers, inter-provincial migrants, etc.) differ in their marital status compositions. Suppose marked differences are observed, that they persist in various cross-tabulations, and that one can assume that they are likely to persist over some significant period of time extending beyond that covered by the statistics. Then, regardless of exactly why or how the differences arise, a local community with a high proportion of a particular migration-status group will be subjected to a strong influence upon its population composition from this group. More generally, the distribution of the local community's population among the migration-status groups bears certain implications for the demographic and socio-economic composition of this population, and an awareness of these implications is vital information to the local policy-maker, businessman or planner. Some value in this information as a partial barometer of the community's growth prospects and problems does not require a knowledge of why the migration-status groups differ in composition, although this knowledge is certainly helpful in determining the full range of the implications of such a difference. In other words, there is some practical value in the census statistics on compositional differences among migration-status groups, even if the statistics do not permit one to test hypotheses as to why or how the differences arise.

Of course, the assumption about the persistence of the compositional differences over some period of time rests ultimately on some explanatory hypotheses about these differences. It is indeed unfortunate that the data cannot be used to adequately evaluate such hypotheses, and that the hypotheses must function mainly as working assumptions in the discussion.

To some extent it is possible to rely on the findings of other research and on the theories of experts in the field but these are, at best, shaky supports. There is some consolation, however, in the fact that almost all areas of economic and demographic forecasting rely on important working hypotheses which cannot be evaluated from existing statistics.

Thus, in this Chapter little emphasis is placed on mobility rates for separate groups where the relevant defining individual characteristics may have changed unpredictably over the 1956-61 period. Instead, in such cases the emphasis is placed on differences in composition among particular migration-status groups. For the most part, the relevant implications of such differences lie in the field of the analysis of *population composition* in a community, rather than in that of the analysis of the causes of group differentials in migration. As regards these causes, it is necessary to make some more or less unsupported assumptions. The characteristics for which these procedures are followed are marital status, education, occupation and income. In the cases of language, religion and ethnic origin it is assumed that a negligible proportion of the sample individuals changed their characteristics over the 1956-61 period.

The general aim of this Chapter is to show some of the important ways in which internal migrants form a distinctive segment of the Canadian population.[1] The distinctiveness of the migrants appears among demographic, economic and social variables. Thus, a community that is subjected to heavy (relative to its size) migrational flows may expect certain definite influences on the demographic and socio-economic structure of its population, depending on the relative sizes and compositions of the inflows and outflows. The demonstration of distinctive composition for the migrant population raises a number of important questions about its causes, but it is not the purpose of this monograph to test hypotheses about these causes.

Before focusing upon the socio-economic variables it is essential that some review be made of some fundamental demographic dimensions of migration statistics. These dimensions, particularly age, so condition migration patterns that the reader must be forewarned of their relevance and the analyst must take them into account in interpreting migration differentials along other dimensions. Therefore, the first two Sections will give brief consideration to age, sex and marital status differentials in migration.

3.1 SOME DEMOGRAPHIC DIFFERENTIALS

3.1.1 AGE – Many individual migration decisions are influenced by the stage reached in the individual or in the family life cycle.[2] Age is markedly

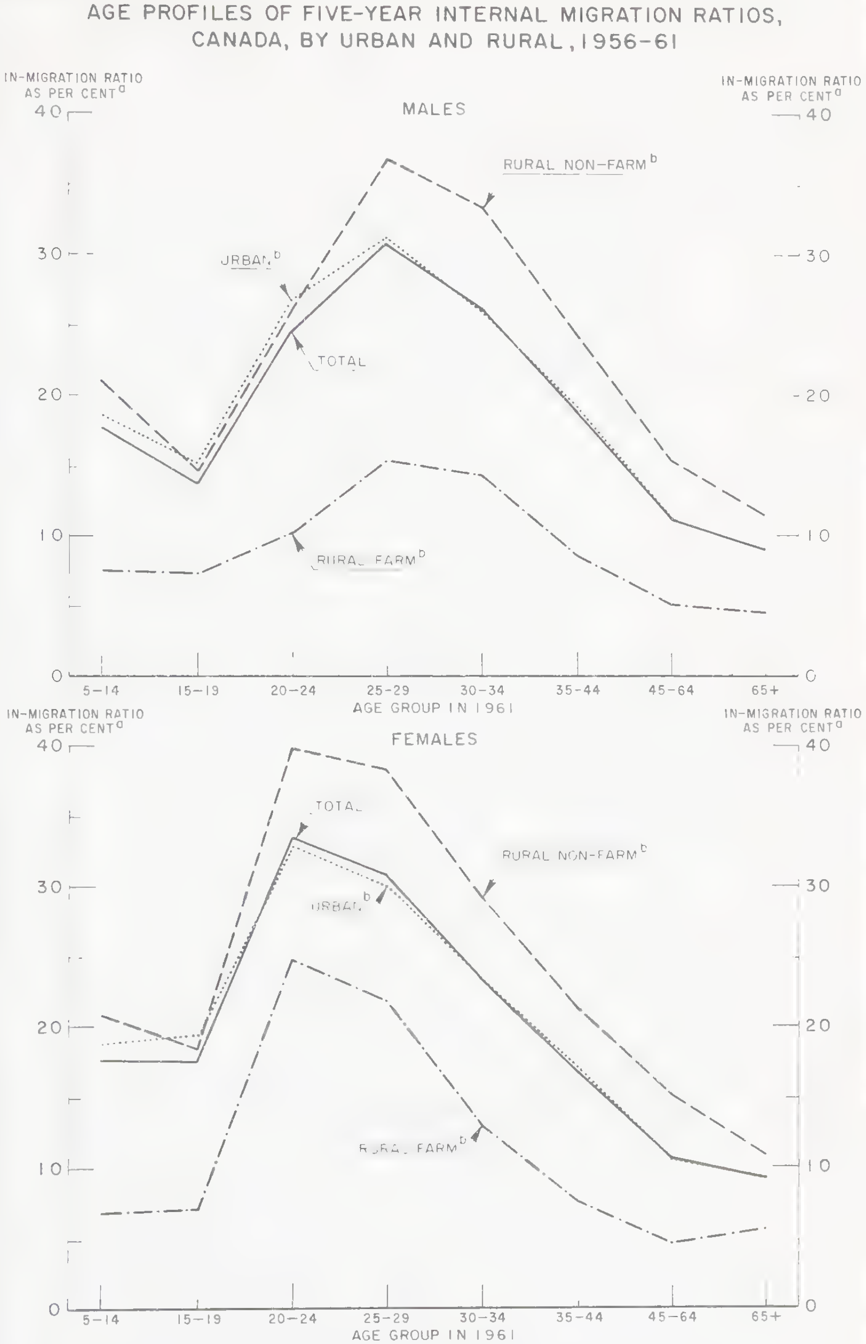
associated with the pattern of change in both of these cycles, and so it is not surprising that age captures a major portion of the inter-individual variation in migration. Almost without exception, migration has shown itself highly selective of age in human populations, being heavily concentrated in the early years of adulthood. In our society these years are significant for such major matters as family formation, childbearing and entry into the working force.

A distinct pattern of age selectivity in the 1956-61 five-year migration ratios is consistently shown among the two sexes for Canada and the 10 provinces. Whether one looks at ratios for in-, out- or net migration, the pattern tends to be the same. Typically, the 1956-61 five-year migration ratio drops (in absolute value) from age group 5-14 to age group 15-19. Then its absolute value rises to a peak at either age group 20-24 (the typical peak for females) or at age group 25-29 (the typical peak for males) and, moving toward the higher ages, the migration ratio tends to fall from the peak. Charts 3.1 to 3.3 show a number of representative patterns.

The persons aged 5-14 in 1961 were aged 0-9 in 1956. Most of these persons were of pre-school age in 1956 and were moving with their highly mobile parents who were concentrated in the 1961 age groups of 25-34. The members of the 15-19 age group in 1961 were generally well settled in school throughout this period (being aged 10-14 in 1956), and their parents had for the most part passed the peak ages for migration before 1956 (when they were concentrated in the age group aged 30-39).

As one moves from the age group 15-19 in 1961 and considers the age group 20-24 in that year, one begins to pick up more and more the persons leaving high school in the 1956-61 period. Over the five-year period from 1956 to 1961 these persons were entering the work force, going on to college, and getting married. Such events also took place at a high rate among persons aged 25-29 in 1961 (20-24 in 1956). Hence it is not surprising that the peak age groups for 1956-61 five-year migration were 20-24 and 25-29 (as of 1961). Although the share of work-force entrants and family-formers declined markedly as one moves from the 1961 age group of 25-29 to that of 30-34, the migration ratios for the latter age group were still high. This is so partly because the children of these persons had not yet reached a life-cycle stage where breaks in the place of schooling become critical, and the parents are just beginning to accumulate those economic obligations and neighbourhood ties which later inhibit the propensity to migrate.

CHART-3.1



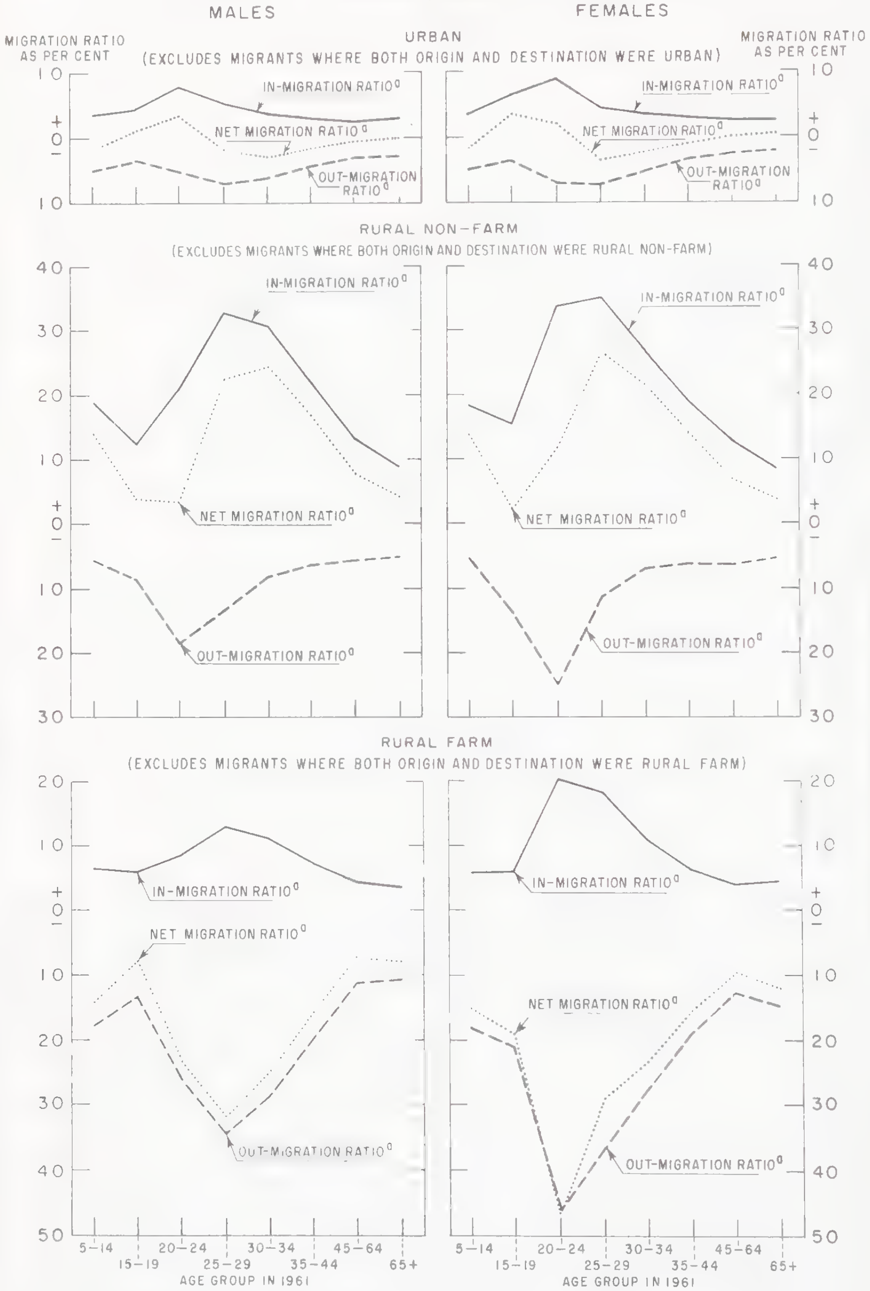
[a] See Table 2.1, footnote[c].

[b] Includes in-migrants from municipalities in this and other categories

Source: Same as Table 2.5.

CHART-3.2

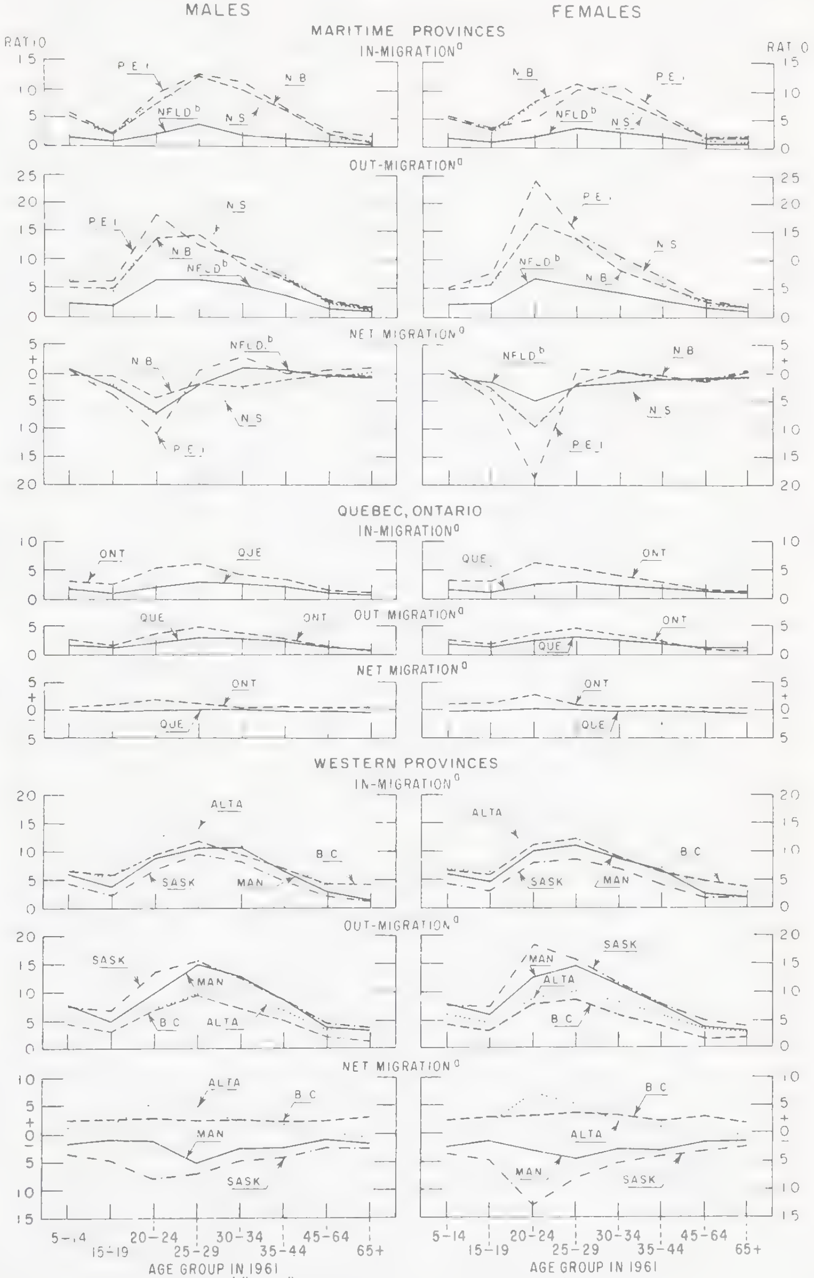
AGE PROFILES OF FIVE-YEAR INTERNAL IN-, OUT- AND NET MIGRATION RATIOS, FOR URBAN, RURAL NON-FARM AND RURAL FARM AREAS, CANADA, 1956-61



a See Table 2.1, footnote c.   Source: Same as Table 2.5.

CHART-3.3

AGE PROFILES OF FIVE-YEAR INTER-PROVINCIAL INTERNAL MIGRATION, PROVINCES, 1956-61



a See Table 2.1, footnote c. b "NFLD." means Newfoundland. For meanings of other symbols see Chart 2.4. Source: Same as Table 2

By the time the age group 35-44 in 1961 is reached, however, the children are generally at least of pre-teenage. They are well settled into elementary or secondary school. Their parents' long-term economic obligations and neighbourhood ties have tended to solidify, and they become less prone to migrate.

Thus, it is possible to interpret the age selectivity in Canadian migration by reviewing the individual and family life-cycle stages that tend to be associated with the various age groups. This review suggests that the age group in which are concentrated the peak years of labour force entry and the early period of working life, and the main ages of family formation and childbearing are particularly important in a study of the social and economic changes and conditions that affect or are influenced by population migration.

The data underlying Chart 2.5 show that the pattern of age selectivity in Canadian migration across provincial boundaries has persisted for several decades. Although these data are influenced by external as well as by internal migration, they probably do not significantly distort the pattern of age selectivity in the internal migration. In almost all decades and for each sex the net intercensal migration ratios rise from age 15-19 to a peak in the age group 25-29. From this peak the net migration ratios tend to fall as one goes toward the higher ages. The main deviations from this pattern are shown by males in two decades marked by relatively heavy immigration – 1921-31 and 1951-61. In these two decades the peak net migration ratio occurs in the age group 30-34, a result that may reflect the influence of the immigrants who may have been slightly older on the average than the internal migrants.

The foregoing discussion should establish the main point which is of relevance to this volume of the internal migration monograph. A definite pattern of age selectivity characterizes Canadian internal migration, and this pattern has persisted for several decades. It is marked by a strong concentration of migrants in the peak ages for labour force entry, for family formation and childbearing, and in the early years of working life. These ages are roughly covered by the age group 20-39 at the end of a migration period of either five or ten years. This is the age group whose migratory characteristics would seem particularly relevant to studies of the non-demographic (particularly economic) aspects of migration in Canada.

A small sex differential is shown among the Canadian five-year migrants in the 1956-61 period. The data underlying Chart 3.1 indicate slightly higher internal migration ratios for females than for males in Canada, as well as in its urban and rural divisions. This differential does vary by age, however. The ratios for females tend to be higher than those

for males mainly in the 15-34 age range; outside of this range, the ratios for males are generally the higher. Among the provinces, the migration ratio differences between the two sexes are rather small and unsystematic (Chart 3.3).

3.1.2 MARITAL STATUS – Persons reporting a five-year change of home were more likely to be married than those who had the same home in 1956 as in 1961. This difference is observed for each sex within the 20-34 age groups as well as for the whole population aged 15 and over, and it appears in urban, rural and rural non-farm areas (see Appendix Table A.1). The persons who became married for the first time in the 1956-61 intercensal period were exposed to the prevalent practice of leaving the parents' (or guardians') home upon marriage and were, of course, reported in the "married" category in 1961. In addition, those who remained married in 1961 as in 1956, and were in the 20-34 age group, were further exposed to the expansions of their families and aging of their offspring, which events tend to increase the need for changed living quarters. Thus, the people reported as married in 1961 were involved in or were exposed to movement-precipitating life-cycle changes to a greater extent than the persons who remained single in 1956 as in 1961. Further, those who remained single probably had a sufficiently different age distribution (even with age group 20-34) from those who were married in 1961 for this difference to affect the distribution of marital status by movement category. These factors were probably influential in determining the greater percentage of married persons among the movers than among the non-movers.

For a given sex-age group, the volume of migration tends to vary inversely with the distance covered in migration. Within each sex-age group it is likely that this generalization applies with special force to that migration which is primarily a response to changes in the life-cycle stage (for example, getting married).[3] It has been suggested above that the population comprised of married persons in 1961 was much more exposed to life-cycle changes than that which remained single throughout the intercensal period. Thus, one would expect the percentage for married persons to be higher among intra-municipal movers than among inter-municipal migrants, the latter tending to cover somewhat longer distances than the former. This expectation is generally supported by the data (Appendix Table A.1).

There may also have been a genuine tendency for the persons who were single in both 1956 and 1961 to have higher inter-municipal migration rates than those who were married either in 1956 or in 1961. Depending on the relative 1956 age distributions of these two marital-status categories, such a marital-status differential in inter-municipal migration rates, as

contrasted with its absence in intra-municipal mobility rates, could lead to an increase in the proportion single as one goes from the intra-municipal movers to the inter-municipal migrants. Unfortunately, a clear demonstration of such a pattern requires knowledge of the 1956 marital status distribution of these movers, or of the probability of remaining single from 1956 to 1961 – either piece of information being unavailable from the 1961 Census data. Thus, it is possible to only speculate as to the possibility of patterns of marital-status (as of 1956) differentials in 1956-61 migration rates.

Among the selected groups of inter-municipal migrants, however, the marital-status distribution does not vary markedly or systematically. The internal migrants do differ markedly from the immigrants in regard to marital-status distribution. The percentage single tends to be markedly higher among the male immigrants and, correspondingly, the percentage married is lower among these immigrants. This differential is not marked among females, however, suggesting that a high proportion of the female immigrants may have been the wives of male immigrants. This difference between internal migrants and immigrants may result in large part from a greater concentration of single persons among the immigrants (than among the internal migrants) even at the time the immigrants arrived in Canada, and from lower exposure to marriage prospects among immigrants.

3.1.3 CONCLUSION – Age, sex and marital status[4] condition migration so persistently that these underlying factors cannot be ignored in proceeding to the main focus – social and economic characteristics of migrants. Lee has nicely summarized the basic concern here, noting that migration may be viewed as a part of the *rites de passage*. Persons who enter the labour force or get married tend to leave their parental home, and persons who are divorced or widowed also tend to migrate. Since some of these events happen in a narrow range of ages, they are important in shaping the age curve of selection. They are also important in determining other types of selection – marital status or size of family (for example, Lee, 1966, *Demography*, p. 57).

Thus, age and marital status tend to be associated with a number of crucial events (in the life cycle) which tend to influence migration decisions. The age profile in particular becomes a basic dimension of migration statistics and it must be taken into account in any full explanation of areal variation in migration rates.

3.2 ETHNIC ORIGIN, LANGUAGE AND RELIGION

As the previous Section has indicated, there are basic demographic factors (such as age) which condition the propensity to move. A number of

other individual characteristics influence the migration decision through their interrelation with the individual's social and economic status. Some of these characteristics interact with the basic demographic factors and others tend to be independent, although their influence upon mobility may be offset by that of demographic factors. These characteristics are social and economic,[5] and in the 1961 Census, for the first time, measurements on such characteristics among migrants were made for roughly 20 per cent of the nation's population. Among the social characteristics for which census data are available, ethnic origin, language and religion form a closely interwoven and prominent group.

Among three broad ethnic origin groups there are distinct differences in the levels of 1956-61 five-year migration ratios. Table 3.1 (column B) suggests that persons reporting British Isles ethnic origin in 1961 were more migratory (internal migration) than those reporting French origin. Persons reporting other ethnic origins (neither British Isles nor French) were also more migratory than those of French origin, according to these data. Such differentials are observed among both sexes within the age group 20-34. Generally supporting information is shown by Nickson, 1967, p. 9, using provincial units, for 1964-65 one-year migration.

Table 3.1 – Five-Year Mobility and Migration Ratios for Three Broad Ethnic Origin Groups, by Sex, Canada, 1956-61

Ethnic origin group	Mobility ratio[a]	Migration ratios		
		Total[b]	Intra-provincial	Inter-provincial
	A	B	C	D
Both sexes	43.5	17.5	13.9	3.6
British Isles	42.7	19.0	14.4	4.6
French	42.1	15.2	13.4	1.8
Other	47.2	17.6	13.8	3.8
Males	43.3	17.3	13.7	3.6
British Isles	42.3	19.0	14.3	4.7
French	41.5	14.8	13.1	1.8
Other	47.1	17.4	13.6	3.8
Females	43.9	17.7	14.1	3.5
British Isles	43.0	19.0	14.4	4.5
French	42.7	15.6	13.8	1.8
Other	47.3	17.9	14.0	3.9

[a] See Table 2.10, footnote [a], for the definition.

[b] To calculate the migration ratio intra-municipal movers are subtracted from the numerator of the mobility ratio (see footnote [a]).

SOURCE: Same as Table 2.5.

Table 3.2 – Five-Year Mobility and Migration Ratios for Language and Religious Groups, Canada, 1956-61

Language and religious groups	Mobility ratio[a]	Migration ratios		
		Total[a]	Intra-provincial	Inter-provincial
All languages	43.5	17.5	13.9	3.6
Roman and Greek Catholics	43.0	15.4	12.9	2.4
Greek Orthodox	43.3	14.4	11.1	3.3
All Protestants	43.5	19.6	15.0	4.6
Jewish	48.0	8.3	6.3	1.9
Other	48.4	20.3	15.6	4.8
English only	43.8	18.5	14.2	4.4
Roman and Greek Catholics	45.0	16.6	12.5	4.1
Greek Orthodox	42.4	14.4	11.1	3.4
All Protestants	43.2	19.5	14.9	4.6
Jewish	47.3	7.9	5.9	2.0
Other	47.7	20.2	15.6	4.6
French only	37.9	12.8	12.2	0.5
Roman and Greek Catholics	37.8	12.7	12.2	0.5
Greek Orthodox	57.0	20.7	18.3	2.4
All Protestants	51.2	20.2	16.9	3.2
Jewish	71.4	7.1	5.4	1.8
Other	59.9	17.0	14.8	2.2
English and French	48.8	18.8	14.9	3.9
Roman and Greek Catholics	48.3	18.1	14.7	3.4
Greek Orthodox	53.9	15.4	11.8	3.6
All Protestants	51.5	25.4	17.5	7.9
Jewish	50.4	9.7	8.1	1.7
Other	63.2	26.5	17.9	8.6
Neither English nor French	54.0	10.7	9.2	1.5
Roman and Greek Catholics	55.3	7.8	6.9	1.0
Greek Orthodox	44.8	9.8	8.0	1.8
All Protestants	55.1	14.9	12.8	2.1
Jewish	56.7	3.6	3.1	0.5
Other	40.8	10.6	8.8	1.8

[a] See Table 3.1, footnotes [a] and [b] for the definitions.

SOURCE: Same as Table 2.5.

Among four broad language groups, persons speaking English only or those speaking both English and French showed the highest five-year internal migration ratios for the 1956-61 period. Somewhat lower five-year migration ratios were shown for persons speaking French only, and still

lower ratios for persons speaking neither English nor French (Table 3.2). Among the inter-provincial migrants, those speaking French only were by far the least migratory. These patterns are generally confirmed in each of the urban, rural non-farm and rural farm populations.

Among five broad religious groups, the Protestants and 'Others' (neither Protestant, Catholic, Greek Orthodox nor Jewish) showed the highest 1956-61 migration ratios. This observation (Table 3.2) tended to hold true within the four broad language groups, the sole exception being those reporting French only as the language. The lowest 1956-61 five-year migration ratios were shown for the persons of Jewish religion in each of the four broad language groups. According to Table 3.2, the rank ordering of the religious groups on the 1956-61 five-year migration ratio varied markedly among the four language groups, suggesting that if religion influences migration this influence interacts with language (that is, the influence tends to change from one language group to another). Here language may be a proxy for some cultural differences which religion fails to reflect fully.

This quick review suggests a marked association between ethnic origin, language and religious groups on one hand, and migration rates on the other. The data show that in the 1956-61 period the most migratory groups were those of British Isles origin and Protestant religion; Catholics were less migratory than Protestants, particularly if they spoke French, and least migratory among the selected religious groups were Jewish persons. These associations may be accidental in the sense that they reflect separate relations of migration and the social characteristics with some 'third' factor. On the other hand, they may indicate Canadian sub-cultures whose geographical distributions and characteristics have a fairly direct bearing on the propensity to migrate. It is not at all unreasonable to suppose that a very significant proportion of Canadians would not reside in a local community where the cultural heritage and the folkways diverge sharply from those with which they are familiar and which are congenial to them, and that this tendency is not significantly counteracted by *existing* economic 'pulls' and 'pushes'. Given the highly varied ethnic, linguistic and religious composition of the Canadian population, it is conceivable that a fully adequate explanation of Canadian migration patterns should require that a prominent place be given to these socio-cultural patterns.

3.3 EDUCATION

Marked associations are observed between education and migration in the 1961 Census statistics. Similar associations have been observed in other studies (cf. Lee and Varon, 1966; Lee, 1953, ch. 8) and they lend

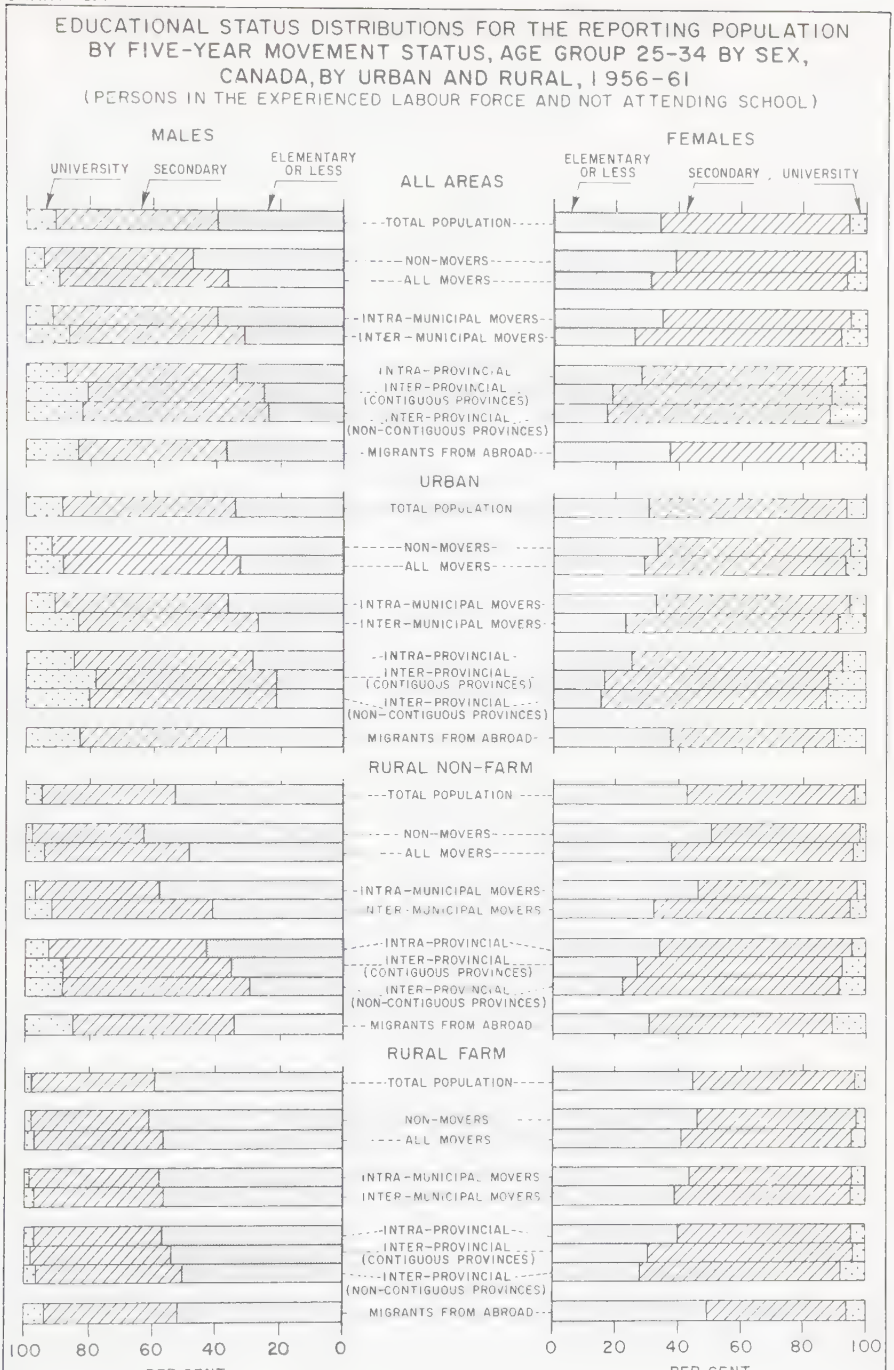
support to the view that education is an important socio-economic determinant of mobility.

Among Canadians not attending school and in the age group 25-34,[6] 1956-61 movers had higher levels of educational attainment than non-movers (Chart 3.4). This statement holds true in urban, rural non-farm and rural farm areas separately. The difference between movers and non-movers in educational distribution is particularly sharp in the urban areas, where a higher-than-average proportion of the in-migrants were probably persons who moved in order to facilitate the attainment of higher education. Thus, a portion of this mover/non-mover differential in educational distribution may be the result of a search for higher education (facilities for which are concentrated in urban areas), rather than a manifestation of differences in mobility rates for groups which have completed their education.

Yet it is likely that such educational differentials in mobility rates played a part in the relatively higher educational attainment in the mover category, as contrasted with the non-mover category. First of all, those with higher education could better afford (than those with low education) the cost of effecting a residence change. Secondly, there may be a genuine increase in the proneness to move (the mobility potential) with advances in the level of educational attainment for a given group, as a result of growing social and economic inducements to movement concomitant with rising educational levels. For example, the quantity and variety of job opportunities requiring mobility may increase as one goes from the lower to the higher education groups, and this improvement in educational level may enhance the desire to attain higher social status in a new residence. Thus it can be hypothesized that, in addition to the impact of the search for the higher education available in urban areas, there was a genuine tendency for mobility rates to increase with the level of completed education. Both of these factors would tend to produce the generally higher levels of education shown for movers than for non-movers among Canadian males aged 25-34 in 1961.

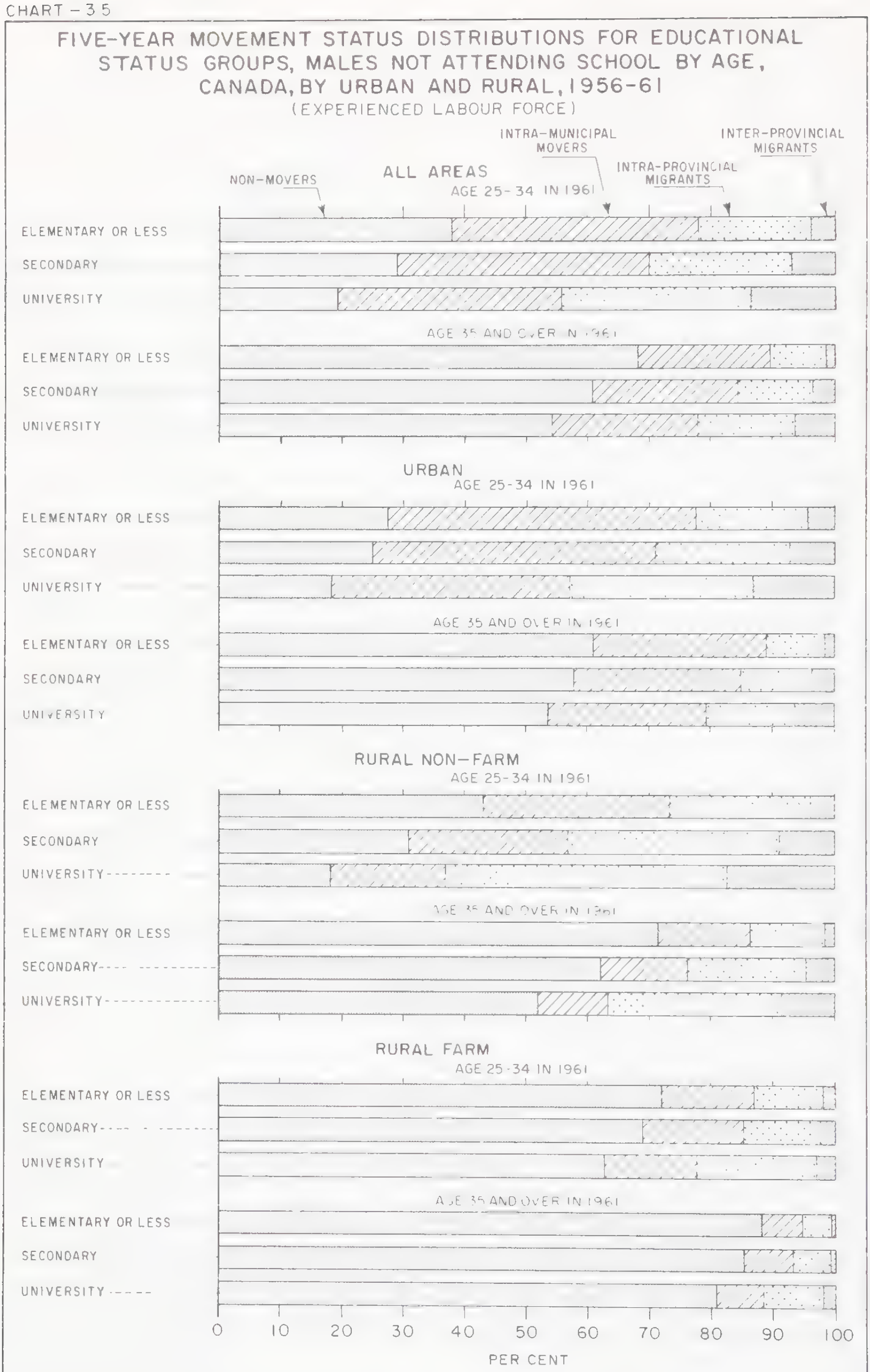
Chart 3.4 shows that although nearly one half of the non-movers had less than high school education only about 35 per cent of the movers were concentrated among this lowest of the three educational categories; although somewhat more than 10 per cent of the movers had some university training, only just over five per cent of the non-movers had university training. These figures pertain to all areas only, but a similar direction of differentials is shown for each of the urban, rural non-farm and rural farm categories.

CHART-3.4



Source: Same as Table 2.5

CHART – 35



Source: Same as Table 2.5.

The hypotheses about the influence upon mobility of the search for higher education and the probably genuine positive association between the level of completed education and the mobility rate (for a group) would lead one to expect generally higher levels of education among the migrants (inter-municipal movers) than among the intra-municipal movers. For the males aged 25-34 in 1961, this is just what Chart 3.4 shows for the urban, rural non-farm and rural farm areas separately. Also consistent with this view is the observation that the inter-provincial migrants had markedly higher levels of education than the intra-provincial migrants.

For example, in Canada, eight per cent of the intra-municipal movers had university education. This percentage increased to 13 per cent among the intra-provincial migrants and to 18 per cent among the inter-provincial migrants (Chart 3.4). Correspondingly, the percentage with, at most, elementary education declines systematically as one goes from the intra-municipal movers to the inter-provincial migrants. This direction of differentials appears without significant exception in the urban, rural non-farm and rural farm areas, each taken separately.

The data underlying Chart 3.4 may be presented in a different manner in order to bring out differences in movement-status distribution among the three educational groups. Chart 3.5 shows clearly that the percentage of movers who were inter-provincial migrants was considerably higher among those with some university education than for those without it. This percentage was also higher among those with high school education than for those with, at most, elementary education. Generally, as one goes from intra-municipal movers to intra-provincial migrants and on to inter-provincial migrants, the proportions fall off least rapidly for those with some university training, more rapidly for those with high school education and most rapidly for those with no more than elementary education. This general pattern of differentials in movement-status distribution among educational groups is observed within each of the urban, rural non-farm and rural farm areas. Here, then, is a clear pattern – as the educational status of the group increased, the proportion of generally longer-distance movers within the group also increased.

As noted above, this tendency may be accidental in the sense that it is markedly influenced by those who migrated in order to achieve higher education. No doubt this was a factor. That it is by no means the whole story, however, is suggested by the data in Chart 3.5 for the age group 35 and over.[7] The proportion of persons with completed education as of 1956 was much higher for this group than for those in the more migratory 20-34 age group. Both age groups showed the same general gradient in

proportions as one goes from intra-municipal movers, to intra-provincial migrants and on to inter-provincial migrants. This observation gives partial support to the view that the 1961 Census data reflect some genuine mobility differentials by educational status independently of the role played by mobility as a vehicle toward higher education.

It is worth noting that the males with some university training, and aged 25-34 in 1961, contained *more* inter-municipal migrants than intra-municipal movers. This holds true in the urban, rural non-farm and rural farm areas separately. It is true for no other education-area group except the rural non-farm males with only high school education. Thus, a negative association between the volume of movers and the distance covered in moving does *not* appear among those with university education when one compares the generally short-distance intra-municipal movers with all migrants.

3.4 OCCUPATION

Education influences occupation, as is well known. Occupations involving technical and professional skills require the higher levels of educational attainment. The previous Section shows data that lend support to the hypothesis that mobility rates tend to increase as one goes from groups with lower to those with higher education. Thus, it may be expected that the occupation groups with higher-than-average percentages of persons at the upper educational levels will show higher-than-average mobility rates. The data from the 1961 Census appear to confirm this expectation.

For males in the experienced labour force, the percentage in 'white collar' occupations is somewhat higher for movers than for non-movers, in the data of the 1956-61 period (Table 3.3). This difference is observed for all of Canada in each of the selected age groups although it does not appear significantly for the urban population.

The intra-municipal movers are primarily responsible for 'pulling down' the percentage 'white collar' among movers. This percentage is much higher among the inter-municipal migrants for each of the selected age groups of the male experienced labour force, and the differential appears in each of the urban, rural non-farm and rural farm populations. Thus, as one goes from the non-movers and the intra-municipal movers to the migrants the per cent 'white collar' rises sharply in each of the selected age groups of the male experienced labour force (Table 3.3). This percentage again rises as one goes from the intra-provincial to the inter-provincial migrants.

As might be expected, the differentials are particularly sharp among the professional and technical occupations, which have an unusually high percentage of university educated persons. Among the professional and technical occupations the differentials between intra-municipal movers and migrants, and between intra- and inter-provincial migrants, are much more persistent than they are in the very broad 'white collar' group. For almost all of the selected age groups and areas, the per cent professional is higher for movers than for non-movers, and is markedly higher for the migrants than for intra-municipal movers. Among the migrants, the per cent in professional and technical occupations increases as one moves from the intra- to the inter-provincial categories.

By now it should be clear that it is difficult to interpret these findings in terms of the differences in the mobility rates of occupation groups. Many of these labour force members no doubt changed their occupations *after* migration. Yet the fact that the patterns for the professional and technical group are observed without marked exceptions among the age groups 20-34, 35-44 and 45-64, and in the three main area types (urban, rural farm, rural non-farm) for each age group, would suggest that the occupational change after migration is not obscuring some genuine tendency toward higher-than-average mobility rates for the professional and technical group.

This interpretation would be further supported if similar patterns of migration ratios could be found by occupation group in the age groups 35-44 and 45-64. The latter age group probably had a rather lower rate of occupational change in the 1956-61 period than did the former, and thus its migration ratios should more clearly reflect genuine occupational differences in mobility rates. If the basic pattern indicated by this latter age group is also observed among persons aged 35-44, there is at least a good hint that this pattern is not peculiar to the 45-64 age group. This similarity in patterns is just what Table 3.4 shows, because the rank ordering of the occupation groups on the percentage of inter-municipal movers (migrants) is almost identical in the 35-44 and 45-64 age groups.

In the 35-44 age group the occupation groups having the highest values on the above-mentioned percentage are (1) service and recreation, (2) professional and technical, (3) sales, (4) managerial and (5) craftsmen, production process and related workers. In the 45-64 age group the rank ordering differs in only one respect – professional and technical ranks higher than service and recreation. The high rankings of the service and recreation group should perhaps be discounted to some extent because this group, particularly when compared with professionals, is one into which 'in-movement' from other occupation groups would be relatively easy.

Table 3.3 – Per Cent in Selected 'White-Collar' Occupations, Males in the Experienced Labour Force by Age and Movement-Status Groups, Canada, by Urban, Rural Non-farm and Rural Farm, 1956-61

No.	Occupation division	Population reporting	Non-movers	Movers within Canada: Total	Movers within Canada: Intra-municipal
		Per cent of all occupations			
	Males – 15 and over				
	All areas –				
1	'White-collar'	31.5	28.6	34.9	32.9
2	Managerial	10.6	10.8	10.8	10.3
3	Professional and technical	7.6	5.8	9.1	7.5
4	Clerical	7.3	6.8	8.0	8.4
5	Sales	6.0	5.2	6.9	6.7
	Urban –				
6	'White-collar'	38.9	39.5	39.0	36.3
7	Managerial	12.6	14.2	11.8	11.0
8	Professional and technical	9.5	8.3	10.1	8.4
9	Clerical	9.3	9.8	9.2	9.5
10	Sales	7.4	7.2	7.9	7.4
	Rural non-farm –				
11	'White-collar'	21.8	21.1	22.3	18.4
12	Managerial	9.8	10.8	8.5	8.2
13	Professional and technical	4.7	3.1	6.3	3.3
14	Clerical	3.6	3.5	3.7	3.2
15	Sales	3.7	3.7	3.8	3.3
	Rural farm –				
16	'White-collar'	3.6	3.3	5.3	3.9
17	Managerial	1.2	1.1	1.7	1.5
18	Professional and technical	0.8	0.6	1.5	0.9
19	Clerical	0.9	0.9	1.1	0.7
20	Sales	0.7	0.7	1.0	0.8

SOURCE: Same as Table 2.5.

Table 3.3 – Per Cent in Selected 'White-Collar' Occupations, Males in the Experienced Labour Force by Age and Movement-Status Groups, Canada, by Urban, Rural Non-farm and Rural Farm, 1956-61

Movers within Canada					Migrants from abroad	No.
Inter-municipal						
Total	Intra-provincial	Inter-provincial				
		Total	Contiguous	Non-contiguous		
Per cent of all occupations						
37.9	37.3	40.2	43.4	36.8	30.4	1
11.7	11.5	12.6	14.2	10.9	6.2	2
11.6	11.2	13.3	14.0	12.6	13.4	3
7.3	7.4	7.0	7.6	6.4	6.3	4
7.3	7.3	7.3	7.7	6.8	4.5	5
43.8	43.2	45.6	49.2	41.9	31.8	6
13.3	12.9	14.3	16.0	12.6	6.4	7
13.2	12.8	14.6	15.4	13.8	13.8	8
8.6	8.8	8.1	8.8	7.4	6.8	9
8.7	8.8	8.6	9.1	8.0	4.8	10
26.0	26 9	21.8	25.3	18.5	22.0	11
9.0	9.5	6.7	8.7	4.8	4.6	12
8.8	8.6	9.6	10.4	8.9	12.7	13
4.2	4.5	2.9	3.7	2.2	2.2	14
4.0	4.2	2.5	2.6	2.5	2.4	15
7.1	7.3	5.6	4.8	6.7	4.3	16
2.0	2.0	1.4	1.5	1.3	1.2	17
2.3	2.4	2.0	1.7	2.4	2.0	18
1.6	1.7	1.0	0.5	1.8	0.5	19
1.2	1.2	1.1	1.1	1.2	0.6	20

Table 3.3 – Per Cent in Selected 'White-Collar' Occupations, Males in the Experienced Labour Force by Age and Movement-Status Groups, Canada, by Urban, Rural Non-farm and Rural Farm, 1956-61 – continued

No.	Occupation division	Population reporting	Non-movers	Movers within Canada: Total	Movers within Canada: Intra-municipal
		Per cent of all occupations			
	Males – 20-34				
	All areas –				
1	'White-collar'	31.7	27.1	34.3	32.1
2	Managerial	6.7	5.3	7.7	7.2
3	Professional and technical	9.2	6.5	10.2	8.2
4	Clerical	9.0	9.2	9.0	9.5
5	Sales	6.8	6.1	7.3	7.2
	Urban –				
6	'White-collar'	37.9	38.8	37.8	35.6
7	Managerial	7.8	7.1	8.3	7.8
8	Professional and technical	11.0	9.3	11.0	9.2
9	Clerical	11.0	13.8	10.2	10.7
10	Sales	8.1	8.5	8.2	8.0
	Rural non-farm –				
11	'White-collar'	19.2	16.6	20.4	16.1
12	Managerial	5.4	4.8	5.8	5.4
13	Professional and technical	5.8	3.5	6.7	3.4
14	Clerical	4.1	4.2	4.1	3.6
15	Sales	3.8	4.1	3.8	3.7
	Rural farm –				
16	'White-collar'	5.5	5.2	6.3	4.2
17	Managerial	0.9	0.8	1.3	1.2
18	Professional and technical	1.7	1.5	2.3	1.2
19	Clerical	1.7	1.8	1.6	0.9
20	Sales	1.2	1.2	1.1	0.8

SOURCE: Same as Table 2.5.

Table 3.3 – Per Cent in Selected 'White-Collar' Occupations, Males in the Experienced Labour Force by Age and Movement-Status Groups, Canada, by Urban, Rural Non-farm and Rural Farm, 1956-61 – continued

Movers within Canada					Migrants from abroad	No.
Inter-municipal						
Total	Intra-provincial	Inter-provincial				
		Total	Contiguous	Non-contiguous		
Per cent of all occupations						
37.4	37.2	37.9	41.6	34.3	29.1	1
8.5	8.5	8.4	9.7	7 2	4.3	2
12.9	12.6	14.0	14.9	13.1	13.6	3
8.5	8.6	8.2	9.0	7.3	6.7	4
7.5	7.5	7.3	7.9	6.7	4.5	5
42.8	42.8	42.8	46.8	38.8	30.4	6
9.5	9.5	9.4	10.6	8.3	4.5	7
14.4	14.2	15.2	16.3	14.2	13.9	8
10.0	10.2	9.5	10.5	8.5	7.2	9
8.9	9.0	8.6	9.4	7.8	4.8	10
24.3	25.2	20.2	23.5	17.2	19.3	11
6.3	6.6	4.8	6.7	3.1	2.8	12
9.5	9.4	10.1	10.9	9.4	12.5	13
4.6	4.9	3.0	3.5	2.5	2.0	14
3.9	4.2	2.3	2.4	2.2	1.9	15
8.7	9.2	6.2	5.8	6.7	4.2	16
1.5	1.5	1.5	1.7	1.2	0.8	17
3.5	3.7	2.4	2.1	2.8	2.5	18
2.4	2.6	1.0	0.6	1.6	0.2	19
1.4	1.4	1.3	1.4	1.2	0.7	20

Table 3.3 – Per Cent in Selected 'White-Collar' Occupations, Males in the Experienced Labour Force by Age and Movement-Status Groups, Canada, by Urban, Rural Non-farm and Rural Farm, 1956-61 – continued

No.	Occupation division	Population reporting	Non-movers	Movers within Canada: Total	Movers within Canada: Intra-municipal
		Per cent of all occupations			
	Males – 35-44				
	All areas –				
1	'White-collar'	33.4	29.9	36.5	34.7
2	Managerial	13.2	12.6	14.1	13.2
3	Professional and technical	8.6	6.7	10.0	8 6
4	Clerical	5.9	5.8	6.0	6.8
5	Sales	5.6	4.8	6.4	6.1
	Urban –				
6	'White-collar'	40.2	39.5	40.5	37.8
7	Managerial	15.4	15.7	15.3	13.9
8	Professional and technical	10.7	9.4	11.1	9.6
9	Clerical	7.3	7.9	6.9	7.6
10	Sales	6.9	6.5	7.3	6.6
	Rural non-farm –				
11	'White-collar'	23.0	22.0	23.8	21.2
12	Managerial	11.8	12.5	10.9	11.4
13	Professional and technical	4.8	3.2	6.4	3.6
14	Clerical	3.2	3.1	3 2	2.8
15	Sales	3.3	3.2	3.4	3.4
	Rural farm –				
16	'White-collar'	3.5	3.0	5.8	5.0
17	Managerial	1.7	1.5	2.7	2.4
18	Professional and technical	0.6	0.4	1.3	0.9
19	Clerical	0.7	0.6	0.9	0.8
20	Sales	0.5	0.4	1.0	0.9

SOURCE: Same as Table 2.5.

Table 3.3 – Per Cent in Selected 'White-Collar' Occupations, Males in the Experienced Labour Force by Age and Movement-Status Groups, Canada, by Urban, Rural Non-farm and Rural Farm, 1956-61 – continued

Movers within Canada					Migrants from abroad	No.
	Inter-municipal					
		Inter-provincial				
Total	Intra-provincial	Total	Contiguous	Non-contiguous		
Per cent of all occupations						
40.9	40.3	43.1	47.4	38.5	34.1	1
16.0	15.5	17.7	20.1	15.1	8.8	2
12.4	11.9	14.3	15.0	13.6	16.0	3
5.2	5.5	4.3	4.8	3.8	4.8	4
7.2	7.4	6.8	7.5	6.0	4.4	5
47.4	46.8	49.6	53.9	45.0	35.5	6
18.4	17.7	20.6	23.2	17.8	9.2	7
14.3	13.8	15.9	16.4	15.5	16.5	8
6.0	6.3	4.9	5.3	4.5	5.1	9
8.8	9.0	8.2	9.0	7.2	4.7	10
26.6	27.8	21.5	25.3	18.2	25.6	11
10.9	11.6	7.8	9.2	6.6	6.1	12
8.6	8.4	9.4	11.0	8.1	14.0	13
3.6	4.0	2.3	3.4	1.4	3.1	14
3.5	3.8	1.9	1.8	2.0	2.3	15
7.0	7.0	6.6	6.0	7.6	5.5	16
3.0	3.1	2.3	1.4	3.7	2.4	17
1.9	1.7	2.8	3.4	2.0	0.8	18
1.0	1.0	0.7	0.5	1.0	1.6	19
1.1	1.1	0.8	0.7	1.0	0.8	20

Table 3.3 -- Per Cent in Selected 'White-Collar' Occupations, Males in the Experienced Labour Force by Age and Movement-Status Groups, Canada, by Urban, Rural Non-farm and Rural Farm, 1956-61 – concluded

No.	Occupation division	Population reporting	Non-movers	Movers within Canada: Total	Movers within Canada: Intra-municipal
		Per cent of all occupations			
	Males – 45-64				
	All areas –				
1	'White-collar'	31.4	29.6	34.7	33.5
2	Managerial	14.8	14.3	15.8	15.0
3	Professional and technical	6.2	5.6	7.0	6.0
4	Clerical	5.9	5.6	6.3	7.0
5	Sales	4.6	4.1	5.5	5.5
	Urban –				
6	'White-collar'	39.3	39.7	38.3	36.5
7	Managerial	17.8	18.2	17.0	15.9
8	Professional and technical	8.0	7.9	7.7	6.6
9	Clerical	7.7	7.9	7.3	7.9
10	Sales	5.8	5.6	6.3	6.0
	Rural non-farm –				
11	'White-collar'	24.4	23.5	26.2	22.1
12	Managerial	14.6	14.6	14.2	13.3
13	Professional and technical	4.0	3.0	5.9	3.5
14	Clerical	3.0	3.0	3.0	2.3
15	Sales	2.9	2.8	3.1	3.0
	Rural farm –				
16	'White-collar'	2.9	2.6	4.8	3.6
17	Managerial	1.5	1.4	2.3	2.0
18	Professional and technical	0.4	0.4	0.9	0.5
19	Clerical	0.5	0.5	0.7	0.4
20	Sales	0.4	0.4	0.9	0.6

SOURCE: Same as Table 2.5.

Table 3.3 – Per Cent in Selected 'White-Collar' Occupations, Males in the Experienced Labour Force by Age and Movement-Status Groups, Canada, by Urban, Rural Non-farm and Rural Farm, 1956-61 – concluded

Movers within Canada						
Inter-municipal					Migrants from abroad	
Total	Intra-provincial	Inter-provincial				
		Total	Contiguous	Non-contiguous		No.
Per cent of all occupations						
39.0	37.4	46.5	47.0	45.8	33.0	1
18.3	17.3	23.0	23.8	22.1	12.2	2
9.5	9.0	11.9	12.4	11.2	10.9	3
5.3	5.4	5.0	4.7	5.3	5.9	4
5.9	5.8	6.5	6.0	7.2	4.0	5
44.8	42.9	52.7	53.2	52.0	34.3	6
20.7	19.4	26.3	26.9	25.6	12.8	7
10.7	10.1	13.0	13.8	12.0	11.0	8
6.2	6.4	5 6	5.2	6.0	6.5	9
7.2	7.1	7.8	7.2	8.4	4.1	10
30.7	31.0	28.1	31.1	24.0	27.9	11
15.4	15.7	13.2	15.8	9.6	9.4	12
8.2	8.0	9.9	9.7	10.2	13.3	13
3.8	3.8	3.3	3.9	2.6	1.5	14
3.3	3.5	1.7	1.8	1.7	3.7	15
6.5	6.8	4.0	2.7	6.0	6.6	16
2.8	3.0	0.8	1.4	–	1.8	17
1.4	1.5	0.4	–	1.1	3.0	18
1.1	1.2	0.9	–	2.4	0.9	19
1.2	1.2	1.8	1.4	2.4	0.9	20

Table 3.4 – Percentage Distribution Among Movement-Status Groups for Selected Occupation Groups, Males in the Experienced Labour Force by Age Group, Canada, 1956-61

Occupation and age groups	Population reporting	Non-movers	Movers within Canada		
			Intra-municipal	Intra-provincial	Inter-provincial
'White-collar' –					
15 and over	100.0[a]	48.2	29.3	17.4	5.1
20-34	100.0	29.0	38.3	25.2	7.6
35-44	100.0	47.2	29.5	17.8	5.4
45-64	100.0	65.1	21.7	10.5	2.8
Managerial –					
15 and over	100.0	53.1	26.7	15.6	4.7
20-34	100.0	26.0	39.8	26.5	7.8
35-44	100.0	49.4	27.9	17.1	5.6
45-64	100.0	66.3	20.5	10.3	2.9
Professional and technical –					
15 and over	100.0	41.8	28.6	22.4	7.2
20-34	100.0	24.7	34.9	30.4	10.0
35-44	100.0	42.3	29.3	21.1	7.3
45-64	100.0	63.4	20.0	12.9	3.6
Clerical –					
15 and over	100.0	49.2	32.2	14.8	3.8
20-34	100.0	34.7	39.3	20.3	5.7
35-44	100.0	51.0	32.4	13.6	3.0
45-64	100.0	66.2	24.2	8.1	1.6
Sales –					
15 and over	100.0	46.0	31.4	17.8	4.8
20-34	100.0	29.9	39.8	23.5	6.8
35-44	100.0	45.0	30.6	19.3	5.1
45-64	100.0	61.8	24.4	11.2	2.7
'Blue-collar' –					
15 and over	100.0	55.5	27.5	13.5	3.5
20-34	100.0	36.4	37.9	19.9	5.8
35-44	100.0	55.4	27.8	13.2	3.6
45-64	100.0	70.8	19.7	8.1	1.4

Table 3.4 – Percentage Distribution Among Movement-Status Groups for Selected Occupation Groups, Males in the Experienced Labour Force by Age Group, Canada, 1956-61 – concluded

Occupation and age groups	Population reporting	Non-movers	Movers within Canada		
			Intra-municipal	Intra-provincial	Inter-provincial
'Blue-collar' – (concluded)					
Service and recreation –					
15 and over	100.0	41.8	31.4	15.4	11.4
20-34	100.0	21.6	37.7	21.1	19.5
35-44	100.0	37.2	30.5	16.9	15.4
45-64	100.0	56.8	28.4	10.8	3.9
Transport and communication –					
15 and over	100.0	46.8	34.2	15.8	3.2
20-34	100.0	29.7	43.5	21.9	4.9
35-44	100.0	50.8	32.6	14.0	2.6
45-64	100.0	67.5	22.8	8.5	1.2
Farmers and other primary – [b]					
15 and over	100.0	75.8	13.8	8.7	1.7
20-34	100.0	59.9	22.4	14.3	3.4
35-44	100.0	75.0	14.6	8.7	1.7
45-64	100.0	84.6	9.2	5.4	0.8
Craftsmen, production process and related workers –					
15 and over	100.0	50.5	31.7	15.1	2.7
20-34	100.0	31.6	42.3	21.7	4.3
35-44	100.0	52.7	30.6	14.3	2.4
45-64	100.0	67.5	22.4	8.9	1.3
Labourers, not elsewhere classified –					
15 and over	100.0	52.0	31.3	13.6	3.1
20-34	100.0	38.8	38.5	17.8	4.9
35-44	100.0	49.2	35.3	13.0	2.6
45-64	100.0	64.6	25.5	8.6	1.3

[a] The percentages may not add to the total due to rounding error.
[b] Farmers, farm labourers, fishermen, hunters and trappers, and loggers.

SOURCE: Same as Table 2.5.

Since the 1950s was a period of marked relative growth of labour demand in the service and recreation group (1961 Census, DBS 94-551, Table 8) at the national level, there probably was a strong net 'in-movement' to that group from other occupations, so that its high rank may have been partly due to occupational mobility (which may, of course, have operated jointly with geographic mobility); at least occupational mobility should have been more influential for this group than for professional and technical occupations.

At the bottom of the rank ordering is the farmers and other primary occupations group, whose percentage of migrants (aged 35-64) was just one third of that for professionals. Again, net occupational mobility out of farming and other primary occupations (and a contrasting net occupational mobility into the professions) is probably a relevant factor in the size of this differential. Other groups near the bottom of the ranking include clerical occupations, transportation and communication workers, and labourers.

3.5 SUMMARY

From the discussion on education and occupation, one may confidently expect to find marked differences in income between movers and non-movers, and between intra- and inter-provincial migrants. Income levels should be higher for movers than for non-movers. They should be higher for migrants than for intra-municipal movers, and should increase as one goes from intra-provincial to inter-provincial migrants. These expectations are based on the strong dependence of income on occupation and education. The 1961 Census data bear out these expectations. For example, the per cent with income of $7,000 or more for the selected age groups of the male labour force varied over the type-of-movement categories in just the manner expected.[8]

In general, the data do suggest that the migrants form a distinctive segment of the Canadian population in regard to their social and economic characteristics. Among language and religious groups, migration ratios are highest for the English-speaking Protestants. Considering the large percentage of Canada's population in this group, it is clear that in the 1956-61 five-year migration the migrants were more likely to be English-speaking Protestants than any other language-religion group. The data also show that the migrants have a heavier weighting among the higher levels of education and the more skilled occupations than the non-migrants. Generally, the differences sharpen as one moves from the intra-provincial to the inter-provincial migrants. Relatively low mobility rates are shown by Jewish

persons and French-speaking Catholics among language-religion groups, by those with only elementary education among educational groups, and by persons in primary and low-skilled occupation groups.

If these broad national patterns are at least moderately representative of the tendencies in a wide variety of local areas, it may be possible to suggest briefly some aspects of their over-all significance. Since the migrants tend to form a rather distinctive group in regard to socio-economic characteristics, it may be suggested that migration be viewed as a component of the processes of social and economic change among Canadian communities. Not only is migration relevant in considering the mechanisms of change in the class structure and in culture, but it is a factor in facilitating technological change and economic growth (cf. Kuznets, 1964). Evidently the social and economic problems and experiences of a local community depend on the socio-economic compositions of the outflows and outlows of migrants to which it is subjected, as well as, of course, on the rates of these flows.

No doubt there are major-regional, provincial and sub-provincial variations about the broad national patterns outlined in this Chapter, which should be taken into account in any analyses of the demographic and socio-economic differentials discussed above; it is hoped that this Chapter contributes to the perspective of background information which is useful in formulating such analyses. At least it should be clear that the demographic and socio-economic composition of an area should be taken into account in an analysis of its migration rates (some concrete development of this idea is contained in Chapters Five to Eight).

FOOTNOTES TO CHAPTER THREE

[1] For example, migrants are more heavily concentrated among certain occupation groups and educational and income levels than is the general population, even when age is controlled.

[2] See Chapter Two, footnote [1].

[3] It is assumed here that such moves are not significantly influenced by 'pull' forces exerted by somewhat distant population centres, and arise mainly from the need to re-locate the domicile at a place where one can satisfy the new demands arising from the life-cycle change. For example, a household head seeking larger quarters for his expanding family is likely to be much less sensitive to the attractions of somewhat distant population centres than is the one seeking to improve his standard of living. The former person becomes a migrant in the statistics if, in the process of establishing his new domicile, he crosses a municipal boundary.

[4] In a discussion such as this, marital status should be considered in conjunction with relationship to the head of the household. This aspect will probably be pursued in the companion volume.

[5] The classification of some characteristics (such as education) into social or economic categories is quite arbitrary and is pursued mainly as a means to organize the discussion.

[6] This age group is chosen so as to restrict the distortion of observations from the relatively lower levels of education that prevail among the older generations. The precise limits, 25 and 34, are those available from the basic tabulations.

[7] A breakdown of this broad age group is not available in the basic tabulations.

[8] The data are not being shown here because they seem so redundant (at the level of broad group differentials) to the already presented statistics on occupation and education.

Chapter Four

THE ATTRACTION OF METROPOLITAN AREAS, A HIGHLIGHT IN RECENT CANADIAN MIGRATION

Chapter Three shows that there was a heavier weighting of higher education and skilled occupations among the 1956-61 internal migrants than in the remainder of the 1961 population, and that this differential is observed within separate age groups. These migrants of higher education and skilled occupation are not distributed at random among the various internal migration streams. Instead, they are concentrated rather heavily in the streams that have large urban complexes as their origins or destinations. The statistics for the Census Metropolitan Areas (MAs) suggest that the Canadian metropolitan areas[1] send or receive at least a majority (without double-counting inter-metropolitan migrants) of the more highly educated and skilled migrants. Moreover, the 'circulation' of such migrants among the MAs is statistically prominent in its own right.

The census monograph on urban development (Stone, 1967[a], ch. 6) found that, over the past four decades at least, there was a steady 'gravitation' of the Canadian population into the main regions of metropolitan growth. While there is clear evidence that the importance of rural-urban migration streams has diminished markedly in recent decades, high rates of net migration into the main regions of metropolitan development were still being observed in the 1951-61 decade. It has been suggested (cf. Stone, 1967[a], p. 141, and Canadian Council on Urban and Regional Research, 1967, pp. 2-3) that metropolitan areas should become a new focus for Canadian migration studies. Given the information on MAs presented in that monograph and that synthesized from the 1961 Population Sample[2] for the purposes of this volume, it may be said that the features of migration for MAs comprise one of the major highlights of the 1961 Census statistics on population. It is, therefore, appropriate that the third

and last of this volume's mainly descriptive chapters be devoted to an exposition on the features of the 1961 Population Sample data on migration for MAs.

4.1 THE PATTERN OF FIVE-YEAR MIGRATION FOR THE METROPOLITAN AREAS AS A GROUP

In the five-year migration for the 1956-61 period, MAs have had net gains in the exchange of population with non-MA areas (taken as a whole). Thus the non-MA areas have had net losses, as is shown clearly by Table 4.1. In the reporting population, MAs as a group had a net migration ratio of two per cent, while the non-MA areas had a net migration ratio of *minus* two per cent.[3] The pattern of MA net gains and non-MA net losses is shown in Table 4.1 for each sex separately and in the important 20-34 age group.

Table 4.1 – Five-Year Internal Migration Ratios for the Census Metropolitan Areas[a] as a Group, by Age Group and Sex, Canada, 1956-61

Reporting population[b]	In-migration ratio[c]	Out-migration ratio[c]	Net migration ratio[c]
	All metropolitan areas		
Age five and over	6.6	4.7	2.0
Males	6.5	4.7	1.9
Females	6.6	4.6	2.1
Age 20-34	10.5	7.4	3.4
Males	10.3	7.3	3.3
Females	10.6	7.5	3.4
	All non-metropolitan areas		
Age five and over	3.6	5.1	– 1.6
Males	3.5	4.9	– 1.4
Females	3.7	5.4	– 1.8
Age 20-34	6.5	9.2	– 3.1
Males	6.1	8.8	– 2.9
Females	6.8	9.7	– 3.2

[a] For definition see 1961 Census, DBS 99-512, pp. 2.1-2.3. The data exclude migrants from one MA to another, or from one non-MA area to another.

[b] See Table 2.1, footnote [b].

[c] See Table 2.1, footnote [c].

SOURCE: Same as Table 2.5.

Both the MA and the non-MA areas had substantial levels on the components of the five-year net migration ratio – in-migration and out-migration ratios. For the reporting population the MAs had an in-migration ratio of seven per cent (counting only those who left non-MA areas), while the non-MA areas had an in-migration ratio of four per cent (counting only those who left MAs). In regard to the out-migration ratio, both the MA and the non-MA areas had a value of nearly five per cent, with that of the non-MA areas being slightly greater in magnitude. That the two groups of areas show roughly similar values on the separate inflow and outflow ratios is notable in connection with the design of an analysis of the economic correlates of migration. Net migration may well tend to be the more sensitive of those migration variables for reflecting areal differences in economic conditions, although the information on separate inflows and outflows undoubtedly helps to clarify the underlying economic-demographic interrelations.

The five-year migration to MAs confirms the common finding that migration ratios are highest in the early years of working life and in the peak ages of family formation. Table 4.1 shows, for example, considerably higher ratios for the 20-34 age group than for all persons aged five and over. This statement holds true both for the in-migration and for the out-migration ratios.

In regard to the sex differential in migration to the MAs, Table 4.1 shows generally higher ratios for females than for males, although the differences by sex are quite small. Among persons aged five and over in 1961, a slightly higher ratio for females is shown for in-migration and net migration; among persons aged 20-34, the female ratio is higher for all three migration ratios.

4.2 INTER-METROPOLITAN DIFFERENTIALS IN FIVE-YEAR MIGRATION

4.2.1 IN-MIGRATION – Among the 17 MAs, the 1956-61 five-year in-migration ratio ranged from a moderate six per cent for Windsor MA to a very high 24 per cent for Calgary MA. Table 4.2 shows that the value for Calgary was more than twice as large as that for all MAs taken together, and that the value for Windsor was roughly two thirds of that for all MAs. Eleven of the 17 MAs had in-migration ratios above the value for all MAs.

Calgary and Edmonton MAs were well ahead of the other MAs in regard to the 1956-61 five-year in-migration ratio; the ratio for Edmonton being almost 20 per cent. Thus at least one fifth of the 1961 reporting population in these Prairie MAs (taken together) was comprised of persons who migrated into these MAs over the preceding five years. The ratio for

Edmonton MA was three percentage points ahead of that for London MA, which had the third highest five-year in-migration ratio (Chart 4.1). Ratios close to that of London were shown by two other Ontario MAs (Ottawa and Kitchener), one far-western MA (Victoria), and one far eastern MA (Halifax).

Table 4.2 – Five-Year Internal In-Migration Ratios[a] for Census Metropolitan Areas, by Age Group and Sex, Canada, 1956-61

Metropolitan area	Total	Male	Female
	Population age five and over		
All MAs[b]	9.9	9.9	9.9
Calgary	23.7	23.3	24.0
Edmonton	19.0	18.9	19.2
Halifax	14.1	14.0	14.3
Hamilton	8.6	8.6	8.5
Kitchener	14.8	14.4	15.1
London	16.0	15.8	16.2
Montreal	6.6	6.6	6.7
Ottawa	15.4	15.6	15.1
Quebec	7.3	7.1	7.5
Saint John	10.5	11.0	10.0
St. John's	7.8	7.6	8.0
Sudbury	12.1	12.2	11.9
Toronto	7.0	7.0	7.1
Vancouver	11.0	11.0	11.0
Victoria	14.4	14.0	14.9
Windsor	6.0	5.8	6.0
Winnipeg	12.0	12.2	11.9
	Population age 20-34		
All MAs[b]	15.7	15.5	15.9
Calgary	34.8	34.7	34.9
Edmonton	27.7	28.2	27.2
Halifax	24.7	24.4	25.0
Hamilton	14.7	14.4	14.9
Kitchener	23.9	23.6	24.3
London	25.9	25.3	26.4
Montreal	10.3	10.0	10.6
Ottawa	22.4	22.3	22.6
Quebec	11.3	10.3	12.2
Saint John	18.7	19.9	17.6
St. John's	13.8	13.2	14.3
Sudbury	21.6	22.8	20.3
Toronto	11.5	11.2	11.7
Vancouver	17.5	17.1	17.9
Victoria	22.6	21.3	23.8
Windsor	9.6	9.7	9.4
Winnipeg	20.0	20.2	19.7

[a] See Table 2.1, footnote c.
[b] Includes migrants from one MA to another.

SOURCE: Same as Table 2.5.

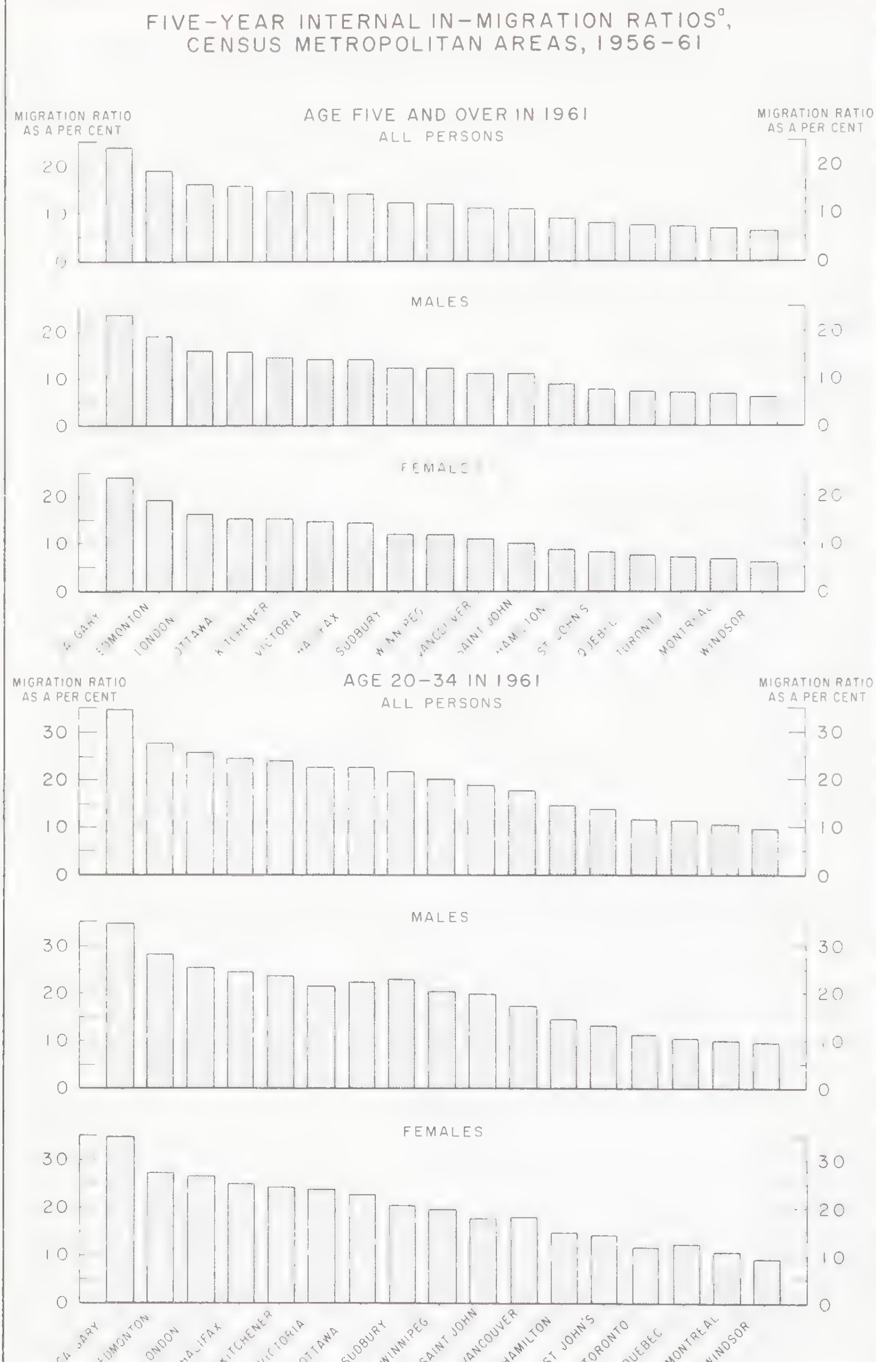
Sharing with Windsor MA the bottom of the ranking in regard to the 1956-61 five-year in-migration ratio, for persons aged five and over in 1961, were Montreal, Quebec and Toronto.[4] Since they are by far the largest MAs in Canada, Toronto and Montreal had clearly the largest absolute numbers of five-year in-migrants. Chart 4.1 shows that with the in-migration ratios these numbers are largely offset by the very large population bases of the MAs.

Chart 4.1 shows clearly that the rank ordering of the MAs on the 1956-61 five-year in-migration ratio is not markedly altered when the data are broken down by sex, for persons aged five and over. This generalization is also substantially true for the sex-specific ratios for the key 20-34 age group; of course, the ratios for that group are at markedly higher levels than those for all persons aged five and over. The principal deviations in the rank order of MAs between the ratios for age group 20-34 and those for the whole reporting population are observed among males aged 20-34 (Chart 4.1). In general, it may be concluded that a basic pattern on inter-metropolitan differentials in the 1956-61 in-migration ratio is observed both in the peak broad age group for migration, 20-34 in 1961, and in the whole reporting population, a similarity which partly reflects the dominance of the 20-34 age group among the in-migrants.

Noteworthy are the very high levels of five-year in-migration ratios shown for the 20-34 age group among the MAs. Montreal MA, Quebec MA, Toronto MA and Windsor MA are the only ones with ratios as low as the 11 per cent level. Even this figure is substantial;[5] it means that at least one out of 10 persons in the 1961 reporting population aged 20-34 in-migrated to the MAs within the preceding five years – and these are only the *internal* migrants, the migrants from abroad being excluded from these data. Fully nine of the 17 MAs had 1961 reporting populations aged 20-34 in which roughly one fifth or more were 1956-61 in-migrants. In Calgary, Edmonton, Halifax, Kitchener and London MAs the ratio rose to nearly one fourth or more. In Calgary MA, more than one third of the 1961 reporting population aged 20-34 were internal in-migrants over the 1956-61 period. These figures exclude not only migrants from abroad but also the in-migrants who died before the 1961 Census as well as those who came and left within the intercensal period, nor do they measure the multiple migrations of the population in this period. When note is taken of these omissions in the statistics, the high level of migration into the Canadian MAs appears striking indeed.

In view of the fact that the rural population comprised roughly one third of Canada's 1956 population (1961 Census, DBS 99-512, Table IV), one may expect that the urban (non-MA) and the MAs supplied the great

CHART – 4.1



[a] See Table 2.1, footnote [c].

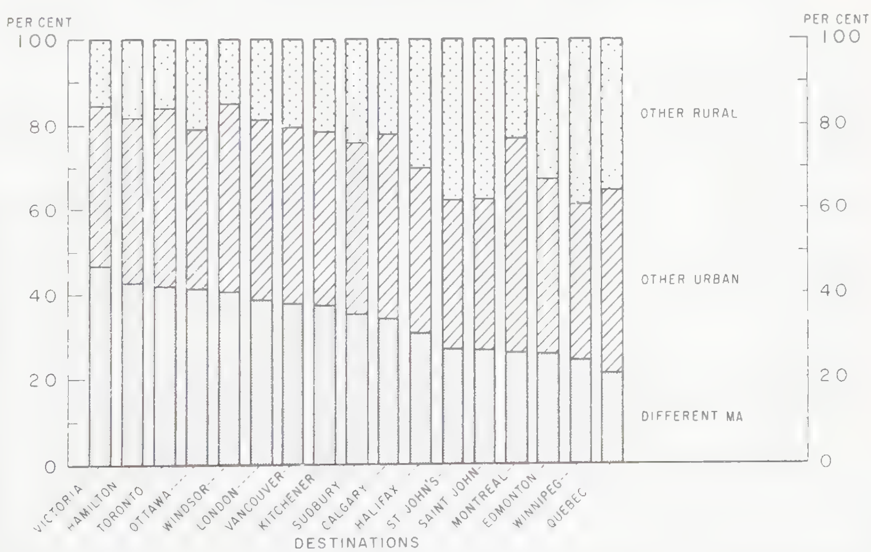
Source: Table 4.2.

majority of the in-migrants to a given MA. Chart 4.2 confirms this expectation clearly. Taking all 17 MAs together, 76 per cent of the five-year internal in-migrants came either from within the MA group or from urban areas outside of MAs (Table 4.3). Thus the share of rural origins in the 1956-61 internal in-migrants to MAs was *less* than their share of the 1956 population.

A disproportionately large share of the MA in-migrants (relative to the share of the 1956 population) is shown as coming from urban areas outside of MAs. For each MA, the proportion of five-year internal in-migrants coming from these urban (non-MA) areas significantly exceeded the proportion of the 1956 population (residing outside the MA) located in such areas. This pattern partly reflects the relative proximity, as compared with other MAs, of the urban (non-MA) areas to MAs. For only two of the 17 MAs did the share of *other* MAs among the in-migrants exceed their share of the 1956 population (residing outside the MA of destination). Each of these MAs (Toronto and Victoria) is located in close proximity to another MA.

CHART - 4.2

DISTRIBUTION OF FIVE-YEAR INTERNAL IN-MIGRANTS TO CENSUS METROPOLITAN AREAS AMONG THREE BROAD AREAS OF ORIGIN, 1956-61



Source: Table 4.3.

Table 4.3 – Percentage Distribution and Relative Shares of Five-Year Internal In-Migrants to Census Metropolitan Areas, Among Three Broad Areas of Origin, Canada, 1956-61

Metropolitan areas	Different MA	Other urban	Other rural
	Per cent distribution of in-migrants from —		
All MAs	34.0	42.4	23.6
Calgary	34.2	43.6	22.1
Edmonton	25.8	41.4	32.9
Halifax	30.8	39.1	30.1
Hamilton	42.7	39.0	18.2
Kitchener	37.4	40.9	21.7
London	38.7	42.5	18.8
Montreal	26.1	50.6	23.3
Ottawa	41.1	37.6	21.3
Quebec	21.1	43.3	35.6
Saint John	26.8	35.4	37.8
St. John's	26.9	35.2	37.9
Sudbury	35.7	40.5	23.9
Toronto	41.8	42.3	16.0
Vancouver	37.9	41.6	20.5
Victoria	46.8	37.8	15.4
Windsor	40.7	44.3	15.0
Winnipeg	24.3	37.0	38.8
	Relative shares[a]		
All MAs	0.8	1.6	0.7
Calgary	0.8	1.7	0.7
Edmonton	0.6	1.6	1.0
Halifax	0.7	1.5	0.9
Hamilton	1.0	1.5	0.6
Kitchener	0.9	1.6	0.7
London	0.9	1.6	0.6
Montreal	0.7	1.7	0.7
Ottawa	1.0	1.4	0.7
Quebec	0.5	1.6	1.1
Saint John	0.6	1.4	1.2
St. John's	0.6	1.4	1.2
Sudbury	0.8	1.6	0.7
Toronto	1.1	1.5	0.5
Vancouver	1.0	1.5	0.6
Victoria	1.1	1.4	0.5
Windsor	1.0	1.7	0.5
Winnipeg	0.6	1.4	1.2

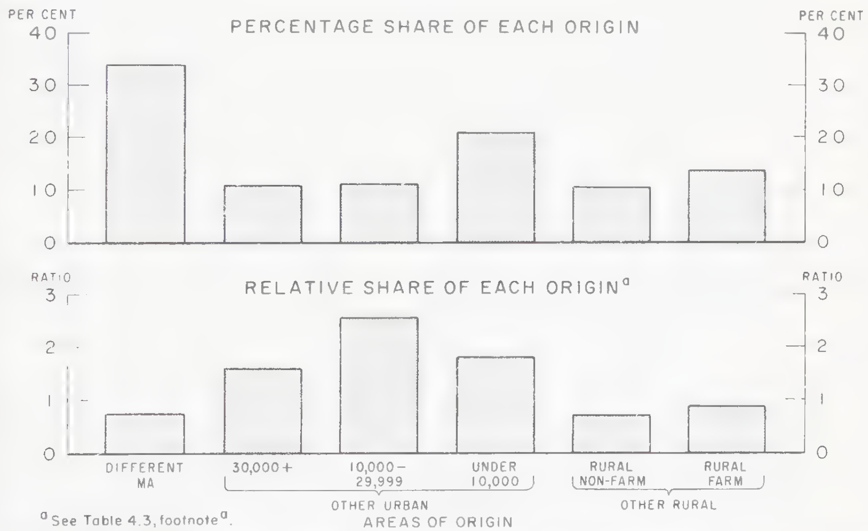
[a] Let *pij* mean the proportion of the 1956 population located in the *ith* area of origin with respect to the *jth* MA (area of destination). Let *qij* be the proportion of the actual total number of in-migrants to the *jth* MA who come from the *ith* area of origin. The relative share for the *ith* area of origin with respect to the *jth* MA (of destination) is defined as *(qij/pij)*, and this is a rough measure of the extent to which the actual share of the *ith* origin (among migrants to the *jth* MA) exceeds or falls below the share of that origin in the pool of potential in-migrants to the *jth* MA.

SOURCE: Same as Table 2.5.

The MAs having the largest percentages of in-migrants coming from other MAs are located in Ontario and British Columbia (Victoria, Hamilton, Toronto, Ottawa, Windsor, London, Vancouver and Kitchener), as Chart 4.2 shows. The MAs having higher-than-average distances to their nearest MA neighbours tend to show the low values on the percentage of in-migrants who resided in other MAs in 1956. The MAs with the highest percentages of in-migrants who resided in rural areas in 1956 were Winnipeg, St. John's, Saint John, Quebec, Edmonton and Halifax. It is readily seen that these MAs are in Eastern Canada and the Prairies, the large regions having lowest levels of urbanization in 1956 (1961 Census, DBS 99-512, Table IV).

CHART – 4.3

DISTRIBUTION OF FIVE-YEAR INTERNAL IN-MIGRANTS TO THE GROUP OF CENSUS METROPOLITAN AREAS AMONG SIX BROAD AREAS OF ORIGIN, 1956-61



[a] See Table 4.3, footnote [a].
Source: Same as Table 2.5.

More detailed data on the origins of the in-migrants to MAs are presented by Chart 4.3 for all MAs together. In this chart the 'other urban' category is broken down into three size groups: under 10,000, 10,000-29,999 and 30,000 and over. Among the six origin categories selected, other MAs had the largest share (slightly more than one third) of the 1961 in-migrants. This means that the in-migrants to individual MAs were more likely to come from other MAs than from any of the other five selected origin categories. The next most favoured source for the in-migrants to

MAs (among the six alternatives chosen) was the other urban size group of 'under 10,000', having roughly one fifth of all the in-migrants to the MAs. None of the other four alternative origins had as much as 15 per cent of the in-migrants to MAs, all four having proportions hovering about 10 per cent. Only the three urban size-group categories had shares of the in-migrants that exceeded their shares of the 1956 population.

When the migrants among metropolitan areas are excluded from the count of in-migrants to metropolitan areas, it is again found (as expected) that only the urban origins had shares of the in-migration to MAs exceeding their shares of the 1956 population outside of MAs. The excess was particularly high for the urban size group of 10,000-29,999, where its percentage was twice as large as its percentage of the 1956 population residing outside of MAs. Thus the under-10,000 size group had the largest absolute share of the in-migrants to MAs from non-MA areas, while the 10,000-29,999 size group had the largest relative share.

4.2.2 OUT-MIGRATION – Among the 17 MAs, five-year out-migration ratios for persons aged five and over in 1961 ranged from four per cent (Montreal) to 16 per cent (Halifax). Ratios very near the 15 per cent level were also shown by Calgary MA and Edmonton MA (Table 4.4). Other MAs showing ratios of at least 10 per cent, among all persons aged five and over in 1961, were Sudbury, London, Victoria and Winnipeg. Joining Montreal MA at the bottom of the ranking in regard to the five-year out-migration ratios were Quebec MA and Toronto MA. It should be noted that the lower the out-migration ratio, the greater is the tendency for the area in question to retain its potential out-migrants. These patterns are observed for males and females separately.

The groups of MAs showing the highest and the lowest levels of the five-year out-migration ratios remain roughly the same as those mentioned above when concentration is placed on the age group of peak migration ratios, 20-34 (Chart 4.4). Among the MAs with the highest ratios, Victoria is added to the list when the age group 20-34 is considered. Calgary, Edmonton, Halifax, London, Sudbury and Victoria MAs show out-migration ratios of at least 20 per cent among persons aged 20-34 in 1961. At the other end of the ranking, five-year out-migration ratios of 10 per cent or less are shown by Montreal, Quebec and Toronto. Again the patterns remain roughly the same when males and females are considered separately.

4.2.3 NET MIGRATION – Among all 17 MAs, the net shift of population due to five-year internal migration was two per cent of their 1961 reporting population. A few areas had net migration losses, the lowest being Windsor with minus three per cent, while Calgary topped the list with a net in-migration ratio of 11 per cent for the population aged five and over in 1961

Table 4.4 – Five-Year Internal Out-Migration Ratios[a] for Census Metropolitan Areas, by Age Group and Sex, Canada, 1956-61

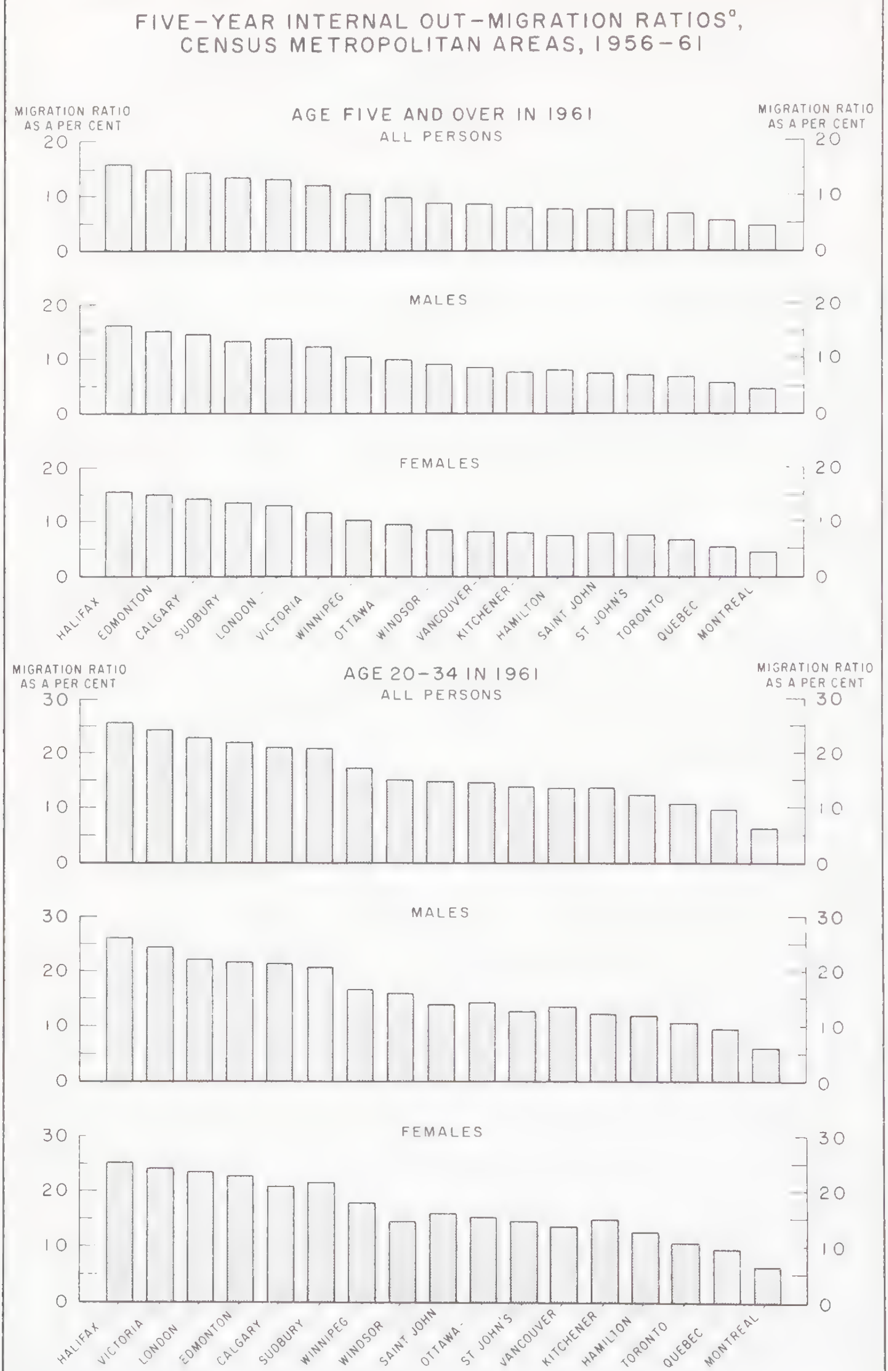
Metropolitan area	Total	Male	Female
	Population age five and over		
All MAs	7.8	7.9	7.7
Calgary	14.4	14.6	14.2
Edmonton	15.0	15.0	15.0
Halifax	15.8	16.1	15.5
Hamilton	7.6	7.8	7.5
Kitchener	7.8	7.5	8.1
London	13.2	13.6	12.9
Montreal	4.5	4.5	4.4
Ottawa	9.7	9.8	9.5
Quebec	5.3	5.4	5.2
Saint John	7.6	7.3	7.8
St. John's	7.2	6.9	7.4
Sudbury	13.4	13.2	13.6
Toronto	6.6	6.7	6.5
Vancouver	8.3	8.4	8.2
Victoria	11.9	12.1	11.6
Windsor	8.7	8.9	8.4
Winnipeg	10.3	10.3	10.2
	Population age 20-34		
All MAs	12.3	12.1	12.5
Calgary	21.0	21.4	20.7
Edmonton	22.0	21.5	22.5
Halifax	25.6	26.2	25.1
Hamilton	12.1	11.8	12.5
Kitchener	13.5	12.1	14.9
London	22.9	22.2	23.5
Montreal	6.1	5.9	6.3
Ottawa	14.7	14.3	15.1
Quebec	9.6	9.6	9.7
Saint John	14.9	13.9	15.8
St. John's	13.6	12.5	14.6
Sudbury	20.9	20.4	21.4
Toronto	10.5	10.5	10.6
Vancouver	13.5	13.4	13.6
Victoria	24.3	24.5	24.1
Windsor	15.0	15.6	14.5
Winnipeg	17.1	16.5	17.7

[a] See Table 2.1, footnote [c].

SOURCE: Same as Table 2.5.

(Table 4.5). Following Calgary, only Kitchener, Ottawa and Edmonton had net migration ratios at or above the five per cent level. At the opposite end of the range were three MAs with net migration losses – Halifax and Sudbury both with minus two per cent and Windsor with its minus three per cent.

CHART—4.4



[a] See Table 2.1, footnote c.

Source: Table 4.4.

Table 4.5 – Five-Year Internal Net Migration Ratios[a] for Census Metropolitan Areas, by Age Group and Sex, Canada, 1956-61

Metropolitan area	Total	Male	Female
	Population age five and over		
All MAs	2.2	2.0	2.3
Calgary	10.8	10.2	11.4
Edmonton	4.8	4.6	4.9
Halifax	– 2.0	– 2.6	– 1.4
Hamilton	1.0	0.9	1.1
Kitchener	7.6	7.5	7.6
London	3.2	2.6	3.8
Montreal	2.3	2.2	2.4
Ottawa	6.3	6.5	6.1
Quebec	2.1	1.8	2.4
Saint John	3.2	4.0	2.4
St. John's	0.7	0.8	0.6
Sudbury	– 1.6	– 1.2	– 2.0
Toronto	0.5	0.4	0.6
Vancouver	2.9	2.8	3.0
Victoria	2.9	2.1	3.7
Windsor	– 3.0	– 3.4	– 2.6
Winnipeg	2.0	2.1	1.9
	Population age 20-34		
All MAs	3.6	3.6	3.7
Calgary	17.5	16.9	18.0
Edmonton	7.3	8.6	6.1
Halifax	– 1.2	– 2.5	0.0
Hamilton	2.9	3.0	2.8
Kitchener	12.0	13.0	11.0
London	3.9	4.0	3.8
Montreal	4.4	4.3	4.5
Ottawa	9.1	9.3	8.8
Quebec	1.9	0.8	2.8
Saint John	4.4	6.9	2.1
St. John's	0.2	0.8	– 0.4
Sudbury	0.9	3.0	– 1.4
Toronto	1.0	0.8	1.3
Vancouver	4.6	4.3	4.9
Victoria	– 2.3	– 4.2	– 0.5
Windsor	– 6.5	– 7.0	– 5.9
Winnipeg	3.4	4.4	2.5

[a] See Table 2.1, footnote [c].

SOURCE: Same as Table 2.5.

Table 4.5 shows that the rank ordering of the MAs in regard to net migration ratios remains very similar to that observed in the whole population aged five and over in 1961 when males and females are considered

separately, or when the migration ratio age group of 20-34 is considered. The principal exception to the pattern of similarity is Victoria, which has a net migration gain for all persons aged five and over and a net migration loss in the 20-34 age group.[6]

4.3 EDUCATIONAL AND OCCUPATIONAL COMPOSITION OF FIVE-YEAR MIGRANTS TO METROPOLITAN AREAS, SELECTED FEATURES

4.3.1 EDUCATION – The data suggest that, among males out of school in 1961, five-year in-migrants to MAs had higher levels of education than the non-migrants. Assuming that almost all of the males not attending school and aged 25-34 are in the labour force, column A of Table 4.6 should provide a good approximation to the educational attainment distribution of the male labour force aged 25-34 and residing in MAs in 1961. Thus columns A and B of Table 4.6 should be approximately comparable. These columns show that the in-migrants to the 1961 MAs had a higher average educational level than did all the residents of these MAs in 1961, for the males aged 25-34 in 1961. For example, while both categories had similar levels on the percentage with secondary schooling only, the in-migrants had a much higher percentage with university education than did the total residents. Therefore, the five-year non-migrants had a considerably lower mean level of education than did the five-year in-migrants to the MAs, among males aged 25-34 in 1961 (see Section 3.4 for relevant comments).

The relatively high mean level of education among the in-migrants to the 1961 MAs (as compared with the five-year non-migrants) is largely accounted for by the in-migrants from *other* MAs. The in-migrants from *other* MAs had considerably higher levels of education than did the in-migrants from non-MA areas. For example, Table 4.6 shows that the percentage with university education was 31 per cent for the in-migrants from other MAs but was only 17 per cent for those in-migrating from non-MA areas.

Roughly similar educational distributions are shown by the in-migrants to MAs coming from non-MA areas and by the out-migrants from MAs going to non-MA areas. The mean level of educational attainment was just slightly higher among those leaving MAs (for non-MA residence) than for those entering MAs (from non-MA residence). The latter group was also better educated by 1961 than were the migrants between non-MA areas – an observation that is not surprising in view of the concentration of the higher educational facilities in and around the larger cities in Canada.

Thus, the following four sets of migration streams may be ranked from highest to lowest in regard to the mean level of educational attainment:

Table 4.6 – Educational Status Distribution for Five-Year Internal In-Migrants to the Group of Census Metropolitan Areas and to Total Labour Force Males Aged 25 - 34 and Not Attending School, Canada, 1956 - 61

Schooling group	Males, 25 - 34, not attending school	In-migrants to metropolitan areas			Out-migrants from MAs to non-MAs[a]	Migrants between non-MAs[a]
		Total	From different MAs[a]	From non-MAs[a]		
	A	B	C	D	E	F
Totals	100.0	100.0	100.0	100.0	100.0	100.0
Elementary or less	32.3	23.2	14.0	29.0	24.6	34.5
Secondary	54.9	54.8	55.3	54.3	56.5	54.1
University	12.8	22.0	30.7	16.7	18.8	11.4

[a] The percentage shown for university education is much higher than that expected from the educational levels of the whole MA population. The extent of the divergence is not known precisely, as this would require educational attainment data for the 1956 MA population. However, assuming continued upgrading of educational levels in the population, the percentage shown for university education in column A for 1961 should be higher than the corresponding 1956 value. This figure is *less than one half* the 30 per cent indicated in column C.

A similar comment may be made about the figures in column D. They are not simply reproductions of the educational levels of the whole non-MA population. In 1961 the male residents of non-MA areas, who were out of school and aged 25 - 34, had six per cent with some university education, much lower than the 17 per cent figure (for persons with some university education) shown for the out-migrants from non-MAs (in-migrants to MAs). Similarly, the percentage with some university education among the out-migrants from MAs (in-migrants to non-MAs) is much higher than the corresponding percentages for either the whole MA or non-MA populations. Even the migrants between non-MA areas (column F) show a higher concentration at the university level than the whole non-MA population.

It is, therefore, indicated that the figures shown in columns C to F are not merely reflections of the educational levels in the respective populations at origin or destination. Over and above this phenomenon is a clear indication of the educational selectivity in the migration streams — a selectivity which operated with particular sharpness for the streams flowing among MAs.

SOURCE: Same as Table 2.5.

(1) inter-MA migrants, (2) MA-to-non-MA migrants, (3) non-MA-to-MA migrants, and (4) inter-non-MA migrants. This rank ordering may not be surprising when consideration is given the concentration in MAs of higher educational facilities and of jobs requiring higher-level skills and the relatively long distances separating MAs. However, expected as this finding may be, it is significant in the identification of the main areas that serve as sources and users of higher level skills in the Canadian economy, particularly when the importance of the location of such areas is considered for the problem of regional economic disparities.

Table 4.7 shows a regular fall in the per cent of in-migrants with university education as one goes, among the broad areas of origin, from different MAs through the largest of the selected urban size groups to the rural category. This statement holds true *both* for the in-migrants to MAs and for the out-migrants from MAs. The range of the per cent with university education is quite large. Among the in-migrants to MAs, for example, the percentage with university education ranges from 31 per cent for those coming from other MAs to 12 per cent for those coming from rural areas outside of MAs. This gradation partly reflects increasing improvement in educational facilities and in the number of jobs requiring higher-level skills as one goes from rural areas (outside of MAs) through the urban size groups up to MAs that happen to contain Canada's largest urban complexes.

Table 4.7 – Per Cent of Five-Year Internal Migrants with Some University Education by Five Broad Areas of Origin and Destination, Labour Force Males Aged 25 - 34 and Not Attending School, the Group of Census Metropolitan Areas in Canada, 1956 - 61

Area	In-migrants to MAs[a]	Out-migrants from MAs[a]
	From:	To:
Different MA	30 7	30.7
Other urban 30,000 and over	27.1	28.3
Other urban 10,000 - 29,999	17.7	22.2
Other urban under 10,000	14.3	19.8
Other rural	12.0	12.4

[a] The conclusion of footnote [a] to Table 4.6 also applies here. The levels of university education shown in these figures for migration streams markedly exceed those of their respective base populations.

It should be noted that the figures in each column must not be added. For example, the first figure of the first column of 30 per cent implies that 70 per cent *of those who came from a different MA* had less than some university education.

SOURCE: Same as Table 2.5.

4.3.2 OCCUPATION – Table 4.8 shows that the per cent in professional and technical occupations is higher for the in-migrants to MAs than for the whole labour force of the MAs. This statement holds true for each of the three age groups identified in Table 4.8. A number of factors probably underlie this persistent differential. Partly it is an aspect of the educational differential discussed in Section 4.4.1 (see Section 3.4 for a comment

on the basis of the educational differential). It may also reflect the concentration of the jobs demanding professional and technical skills within MAs, since the differential appears in each of the selected age groups within the 25-64 age range. Of course, the relatively long distances separating the MAs are also relevant.

Table 4.8 – Per Cent in Professional Occupations Among Five-Year Internal Migrants to the Group of Census Metropolitan Areas and to Labour Force, Males by Age Group, Canada, 1956-61

Age group	Males in the labour force	In-migrants to MAs			Out-migrants from MAs to non-MAs	Migrants between non-MAs
		Total	From a different MA	From non-MA areas		
25-64	11.0	16.0	19.4	13.8	14.9	10.4
25-34	12.8	17.8	22.8	14.5	17.1	11.3
35-44	11.7	15.9	17.9	14.6	13.9	10.8
45-64	8.9	12.2	13.8	11.3	10.5	8.4

SOURCE: Same as Table 2.5.

As with education, the differential between the in-migrants and the total male labour force in the per cent of professionals is much more due to the in-migrants from other MAs than to in-migrants from non-MA areas. In each of the selected age groups the percentage in the professional and technical occupation group is markedly higher among the in-migrants from other MAs than among the in-migrants from non-MA areas (Table 4.8). For example, among the highly mobile 25-34 age group, the per cent professional and technical among in-migrants to MAs is almost 10 points higher for those coming from other MAs than for those coming from non-MA areas.

As in the case of education, the per cent in professional and technical occupations does not differ markedly between the MA-to-non-MA and the non-MA-to-MA migrants. Also, the MA-to-non-MA migrants have a higher value on this percentage than do the migrants between non-MA areas. Once again it is seen that the streams of migration involving the MAs had higher levels of skill than those not involving MAs. The following rank ordering of four sets of migration streams is observed in regard to the concentration of the stream among professional and technical occupations: (1) migrants between MAs, (2) migrants from MAs to non-MA areas, (3) migrants from non-MA areas to MAs, and (4) migrants between non-MA areas. This is another reflection of the possibly crucial role of the large urban complexes

as the areas in which innovations and important economic structural changes are generated.

Thus, selecting the MAs, other urban and other rural areas as three broad nodes for migration streams, it is found that the greatest concentration in higher levels of education and occupational skills is observed in the inter-metropolitan streams. This tendency is sharp and systematic over various age groups of the male labour force. In addition, the other streams in which MAs form either origins or destinations have much larger concentrations of the higher levels of education and occupational skills than the streams among non-metropolitan origins and destinations. According to the Population Sample tabulations, the streams involving MAs are the largest in volume given among the three nodes mentioned above and it is therefore clear that the migrants with higher-level education and skills move primarily among MAs, and secondarily between MAs and non-MA areas. The major sources of such migrants to non-MA areas are the MAs, and the major destinations of such migrants from non-MA areas are again the MAs.

4.4 MIGRATION WITHIN CENSUS METROPOLITAN AREAS

For the first time in 1961 the census statistics permit some unravelling of the net migration to parts of MAs across Canada so as to show the component inflows and outflows. In the following discussion it will be necessary to deal with just a simple dichotomy for each MA – central city and 'ring' (central city refers to the largest incorporated city within the MA and 'ring' to the remainder of the MA). The basic tabulations also define the central city as conterminous with the largest incorporated centre within the MA.[7]

4.4.1 INTRA-METROPOLITAN DISTRIBUTION OF THE MIGRATION INTO AND OUT OF THE WHOLE MA – In-migration ratios may be computed separately for the incorporated central city and for the ring of each MA; Table 4.9 shows the results of these computations. Generally, the MAs with higher-than-average in migration ratios to the incorporated central city show higher-than-average ratios for the ring. Edmonton and Calgary are far ahead of the other MAs in the 1956-61 in-migration ratio whether the incorporated central city is considered or the MA ring. However, there is some change in the set of areas with lowest in-migration ratios as attention is turned from the incorporated central city to the MA ring (Table 4.9).

Generally, the MA rings had higher in-migration ratios than the incorporated central cities, as may be expected from the widespread evidence of lagging growth rates in the cores of metropolitan areas. More striking is the fact that the central city-ring differentials in in-migration ratio are not

nearly as great as might be expected from the data on differentials in net-migration ratios (including intra-metropolitan migration).[8] This observation indicates that the central city-ring differential in *intra*-metropolitan migration is a major component of these well-known net migration ratio differentials. For the 1956-61 period, it can be said that *both* the incorporated central cities and the rings of the 1961 MAs had moderate to high in-migration ratios when focus is placed only on the internal migrants from *outside* MAs.

The vast majority of the out-migrants from the 17 MAs left the central cities (incorporated) rather than the rings of the MAs. For all 17 MAs taken together, 80 per cent of the out-migrants left the central city, the percentage ranging from 67 per cent in Kitchener to 98 per cent in St. John's.[9]

It may be recalled that, for all MAs as a whole, 34 per cent of the in-migrants resided in other MAs in 1956. The data now suggest strongly that most of these persons left the central cities of their respective MAs of residence in 1956. Since almost one half of these in-migrants settled in the rings of the MAs of residence in 1961, the data point to significant streams of migration originating in the central cities of MAs and ending in the rings of other MAs. However, it should be recalled that a majority (52 per cent for all MAs taken together) of the MAs in-migrants did reside in the central cities in 1961.

The out-migration ratios for the central cities and for the rings of the MAs show clearly that the rings had a much stronger tendency to retain their potential out-migrants than did the central cities. The out-migration ratios for the central cities were generally much higher than those for the rings (Table 4.9). Thus, quite high net migration ratios were shown for the rings of almost all MAs; only Windsor and London showed ring-area net migration ratios below five per cent. By far the highest ratios, actually in excess of 20 per cent, were shown by Edmonton and Calgary and ratios near 10 per cent by Victoria, Saint John, Winnipeg, Kitchener and Ottawa. It should be recalled that these figures *exclude* the intra-metropolitan migration between central city and ring.

As might be expected from the foregoing discussion, few of the MA central cities had net internal migration gains. Once again Calgary led the list with a high net internal migration ratio of nearly 10 per cent for its central city. Net migration gains for the central city were also shown by Kitchener, Ottawa, London, and Edmonton. The greatest net internal migration losses for the central city were shown by Victoria, Halifax, Toronto and Windsor.

Table 4.9 – Five-Year Internal Migration Ratios for the Central Cities and 'Rings' of Census Metropolitan Areas, Canada, 1956-61

(Migrants entering or leaving each MA)

Metropolitan area	In-migration ratio[a]	Out-migration ratio[a]	Net migration ratio[a]
	Central city[b]		
All MAs	9.7	11.2	– 1.7
Calgary	23.6	15.7	9.4
Edmonton	17.8	16.9	1.1
Halifax	12.7	21.0	– 10.5
Hamilton	6.6	8.0	– 1.5
Kitchener	15.8	11.1	5.2
London	16.5	13.4	3.6
Montreal	5.0	5.7	– 0.7
Ottawa	17.2	13.3	4.5
Quebec	5.2	7.7	– 2.7
Saint John	8.9	10.4	– 1.6
St. John's	7.7	9.6	– 2.1
Sudbury	11.4	15.7	– 5.1
Toronto	5.9	13.3	– 8.5
Vancouver	9.6	11.3	– 1.9
Victoria	14.3	26.4	– 16.4
Windsor	5.4	12.4	– 8.1
Winnipeg	12.1	15.7	– 4.3
	'Ring'[b]		
All MAs	10.3	3.5	7.0
Calgary	25.7	4.3	22.4
Edmonton	26.1	3.4	23.6
Halifax	15.7	10.1	6.2
Hamilton	12.7	6.9	6.2
Kitchener	13.9	4.8	9.5
London	11.3	11.9	– 0.6[c]
Montreal	8.7	2.8	6.1
Ottawa	12.8	4.1	9.1
Quebec	9.3	2.9	6.6
Saint John	12.8	3.3	9.9
St. John's	7.9	0.5	7.4
Sudbury	13.3	7.2	6.6
Toronto	7.8	2.6	5.3
Vancouver	12.5	5.4	7.4
Victoria	14.7	1.9	13.0
Windsor	6.8	2.6	4.3
Winnipeg	12.1	2.8	9.6

[a] See Table 2.1, footnote [c].

[b] "Central city" refers to the largest incorporated city within the MA. 'Ring' refers to the remainder of the MA. See footnote [7] to the text for a relevant comment.

[c] The figures for the central city are based upon its 1961 area. London city's substantial annexations in the 1956-61 intercensal period left a small population in its 1961 'ring' area. This population increased by just one per cent in the 1956-61 intercensal period (1961 Census, DBS, 92-535, Table 10), a result which is consistent with the negative value shown for the London 'ring' in this column. Had the London city figure been based on its 1956 area, the 'ring' would then have shown a substantial positive net migration ratio (1961 Census, DBS, 99-512, Table X).

SOURCE: Same as Table 2.5.

4.4.2 MIGRATION BETWEEN CENTRAL CITY AND RING – The previous Section, which deals with migration into and out of the MA, shows that both central city and ring had substantial rates of in-migration, but the central city had much higher relative out-migration losses (to areas *beyond* the MA boundaries) than did the ring. Thus, the result of the migration into and out of the MA was a net loss to the central city and a net gain to the ring.

This differential in net migration also shows up quite sharply in the *intra*-metropolitan migration, in which only two areas are recognized – central city and ring. Table 4.10 shows that, for all MAs taken together, the central city had a net migration ratio of minus eight per cent in intra-metropolitan migration, which became a net migration ratio of plus nine per cent for the ring. These figures pertain to the reporting population aged five and over in 1961. With a single minor exception, this pattern is observed in all 17 MAs and is particularly sharp in Hamilton, Montreal, Quebec and Vancouver.

These data permit the following breakdown of the well-known central city-ring differentials in net migration – at least for the 1956-61 period. Both the central cities and the MA rings tended to have substantial in-migration ratios for persons coming from outside the MAs but the central cities failed to have significant in-migration ratios among the intra-metropolitan migrants. That is, the stream of migrants from the ring of an MA to the central city of an MA was very weak relative to the size of the central city population. Thus, the in-migrants to the central city were mostly persons coming from outside the MA. The ring, on the other hand, had significant in-migration ratios *both* from outside the MA and from the central city of the same MA. As regards out-migration to destinations outside the MA, the central city was the major contributor.

As regards the components of net intra-metropolitan migration, the relatively high gains and low losses of the MA ring stand out sharply. Taking all MAs together, the ring had an in-migration ratio of 11 per cent and an out-migration ratio of two per cent. The central city had an in-migration ratio of two per cent and an out-migration ratio of nine per cent. Thus there was a dramatic redistribution of the MAs population out of the central city. With the single exception of London (Table 4.9, footnote[c]), all 17 MAs show this pattern of differentials. The intra-metropolitan in-migration ratios for the ring are particularly high in Calgary, Edmonton, Saint John, Montreal, Quebec, Vancouver and Hamilton MAs. With the notable exceptions of Calgary and Edmonton, these same MAs show particularly high out-migration ratios for the central city.

Table 4.10 – Five-Year Intra-Metropolitan Migration Ratios, Census Metropolitan Areas, Canada, 1956-61

(Excludes migrants entering or leaving the MA)

Metropolitan area	In-migration ratio[a]	Out-migration ratio[a]	Net migration ratio[a]
	Central city		
All MAs	1.5	8.6	– 7.7
Calgary	1.0	3.3	– 2.4
Edmonton	1.1	4.2	– 3.2
Halifax	2.6	9.1	– 7.2
Hamilton	1.9	8.4	– 7.1
Kitchener	1.7	6.7	– 5.4
London	1.0	1.0	0.0
Montreal	1.8	12.0	– 11.5
Ottawa	2.8	4.4	– 1.8
Quebec	1.7	11.5	– 11.1
Saint John	1.6	7.7	– 6.6
St. John's	0.2	1.3	– 1.2
Sudbury	2.3	3.2	– 1.0
Toronto	0.8	9.4	– 9.6
Vancouver	1.7	10.7	– 10.1
Victoria	1.2	4.2	– 3.1
Windsor	1.2	6.3	– 5.5
Winnipeg	1.1	5.5	– 4.6
	'Ring'		
All MAs	10.7	1.9	8.9
Calgary	26.4	9.2	18.9
Edmonton	24.1	7.4	18.0
Halifax	9.9	2.8	7.3
Hamilton	19.8	5.0	15.6
Kitchener	5.8	1.5	4.4
London	11.3	11.2	0.1[b]
Montreal	17.5	2.8	15.1
Ottawa	6.5	4.1	2.5
Quebec	12.3	1.8	10.7
Saint John	11.8	2.5	9.6
St John's	3.3	0.4	2.9
Sudbury	7.6	5.5	2.3
Toronto	5.6	0.4	5.2
Vancouver	11.2	1.8	9.6
Victoria	2.2	0.6	1.6
Windsor	9.6	1.8	7.9
Winnipeg	6.9	1.4	5.6

[a] See Table 2.1, footnote [c].
[b] See Table 4.9, footnote [b].

SOURCE: Same as Table 2.5.

4.4.3 SELECTED CENTRAL CITY-RING DIFFERENTIALS IN THE CHARACTERISTICS OF FIVE-YEAR MIGRANTS – There were marked differentials in marital status distribution between the migrants from the

central city to the ring and those going in the opposite direction. Although most of the migrants were married (in the 20-44 age group) in either stream, the per cent single was much higher among those moving in the direction of the central city than those moving toward the ring. This differential is shown in each of the selected age groups shown in Table 4.11. Correspondingly, the per cent married was much higher among those going to the ring than among those going to central city. This differential may largely reflect the difference between central city and ring in the relative supply of the facilities demanded by families with children of school age.

Table 4.11 – Marital Status Distribution for Intra-Metropolitan Five-Year Migrants by Age Group and Sex, Canada, 1956-61

(Excludes migrants entering or leaving the MA)

Area	Total	Single	Married	Widowed or divorced
	Males			
In-migrants to Central city –				
20-44	100.0[a]	18.1	81.1	0.8
20-24	100.0	55.6	44.4	–
25-29	100.0	17.4	82.4	0.2
30-34	100.0	8.3	91.2	0.5
35-44	100.0	6.6	91.6	1.8
In-migrants to 'Ring' –				
20-44	100.0	10.0	89.7	0.4
20-24	100.0	46.2	53.7	0.1
25-29	100.0	9.4	90.5	0.1
30-34	100.0	5.2	94.5	0.3
35-44	100.0	3.9	95.5	0.7
	Females			
In-migrants to Central city –				
20-44	100.0	15.3	82.5	2.2
20-24	100.0	33.2	66.8	–
25-29	100.0	15.3	84.0	0.7
30-34	100.0	9.9	87.6	2.5
35-44	100.0	7.6	88.0	4.4
In-migrants to 'Ring' –				
20-44	100.0	6.4	92.5	1.1
20-24	100.0	17.2	82.5	0.3
25-29	100.0	5.1	94.5	0.4
30-34	100.0	3.4	95.7	0.9
35-44	100.0	4.4	93.4	2.1

[a] See Table 4.6, footnote [b].

SOURCE: Same as Table 2.5.

In the intra-metropolitan migration of labour force males aged 25-34, those moving from the central city to the fringe were somewhat better educated, on the average, than those moving in the opposite direction. Table 4.12 shows that the percentage with at least high school education was six points higher for the central city-to-ring migrants than for all ring-to-central city migrants. Thus, the net influence of this exchange was to slightly enhance the educational level of the ring population at the expense of that in the central city. In 1961 the male population out of school and aged 25-34 had slightly higher average educational attainment in the ring than in the central city populations of MAs; 71 per cent of this ring population had had at least high school education while the corresponding percentage for the central city population was 64 per cent. It is also notable that among the in-migrants (labour force males aged 25-34 and out of school) to the MAs the educational attainment distribution for the central city residents had a higher percentage of university-trained persons than that of the ring residents. The per cent with university education was 23 per cent among the in-migrants to the central city, and was 21 per cent among the in-migrants to the fringe.[9] Thus, the impact of the 1956-61 five-year migration on the central city-ring differences in educational composition came mainly from the intra-metropolitan population redistribution.

Table 4.12 – Educational Status Distribution for Intra-Metropolitan Five-Year Migrants, Labour Force Males Aged 25-34 and Not Attending School, Canada, 1956-61

(Excludes migrants entering or leaving the MA)

Area	Total	Elementary or less	Secondary	University
	In-migrants to Central city			
All MAs[a]	100.0	35.5	52.3	12.2
	In-migrants to 'Ring'			
All MAs[a]	100.0	28.4	58.2	13.4

[a] See Table 4.6, footnote [b].

SOURCE: Same as Table 2.5.

Among labour force males aged 25-64, the five-year migrants going from the central city to the ring had a somewhat higher concentration in the broad 'white-collar' group of occupations than did those moving from ring to central city (Table 4.13). This difference is most marked in the

Table 4.13 – Occupation Group Distribution for Intra-Metropolitan Five-Year Migrants, Labour Force Males by Age Group, Canada, 1956-61

(Excludes migrants entering or leaving the MA)

Occupation division	Central city[a]	'Ring'[a]	Central city[a]	'Ring'[a]
	Age 25-64		Age 25-34	
All occupations[b]	100.0	100.0	100.0	100.0
Managerial	14.3	16.0	8.5	13.1
Professional and technical	11.4	13.3	12.6	14.8
Clerical	9.0	8.9	10.0	9.5
Sales	9.3	9.7	8.5	10.5
Service and recreation	8.3	6.3	6.6	5.7
Transport and communication	10.8	9.1	13.0	9.9
Farmers and farm workers	1.1	0.6	1.0	0.4
Other primary occupations	0.4	0.3	0.4	0.3
Craftsmen, production process and related workers	30.6	33.3	35.3	33.1
Labourers, not elsewhere classified	4.8	2.6	4.0	2.6
	Age 35-44		Age 45-64	
All occupations[b]	100.0	100.0	100.0	100.0
Managerial	18.4	17.1	17.2	20.6
Professional and technical	11.4	13.8	9.8	9.0
Clerical	7.1	8.5	9.8	8.4
Sales	9.5	10.0	9.9	7.7
Service and recreation	7.6	5.3	11.1	9.0
Transport and communication	11.6	9.0	7.4	7.5
Farmers and farm workers	1.3	0.5	1.1	1.1
Other primary occupations	0.3	0.3	0.6	0.4
Craftsmen, production process and related workers	28.7	33.3	26.7	33.6
Labourers, not elsewhere classified	4.1	2.3	6.4	2.9

[a] The figures refer to in-migrants to the stated MA parts.
[b] See Table 4.6, footnote [b].

SOURCE: Same as Table 2.5.

professional and managerial occupation groups. Correspondingly, the concentration of intra-metropolitan migrants among 'blue-collar' occupations is somewhat higher for those moving toward central city from the ring than those going in the opposite direction. The differences are distinct, although they are not very sharp (Table 4.13). Within each of these two broad and rather heterogeneous groups (white-collar and blue-collar) only one divergent pattern is shown. The craftsmen, production process and related workers made up a distinctly larger proportion of the stream flowing from central

city to ring than they did of the stream flowing in the opposite direction. There is some variation about the general pattern shown for the 25-64 age group among the three age-group subdivisions that Table 4.13 identifies, the most divergent age group being 45-64.

In sum, there is a very marked intra-metropolitan redistribution of population generated by the 1956-61 five-year migration. This redistribution affected the differences between central city and ring in population composition as well as in size. The impact on population composition involved social and economic, as well as demographic factors. Generally, the net effect of this redistribution was to raise the levels of education and occupational skills in the ring and to lower it in the central city.

Of course, the intra-metropolitan population redistribution would have been less impressive had the central city been delineated more realistically (at least as the continuous built-up area containing the largest incorporated centre of the MA). However, the basic differentials indicated above would survive this more desirable delineation, although with less striking profiles.

This intra-metropolitan redistribution is partly an aspect of the traditional lateral expansion of cities. It is particularly notable, however, because of its extremely high rate since the 1940s (Stone, 1967[a], Sect. 6.3). Municipal authorities are familiar with this phenomenon, and indeed must find that it lies near the heart of their most pressing problems in the areas of local government structure, services and financing. What the foregoing discussion does is to add to the concrete documentation of the dimensions of these contemporary population changes.

4.5 CONCLUDING REMARKS

Persons with higher-level education and occupational skills tend to be heavily concentrated among migration streams in which MAs are either origins or destinations. The streams between MAs (inter-metropolitan migration) have unusually high percentages of such persons. These findings suggest that large urban agglomerations are the major sources of supply and demand for higher-level occupational skills, so that the metropolitan economies are major *loci* of the innovations and structural change that are so important in national and regional development.

Coupled with the above-mentioned findings, the observation that MAs (taken together) have a generally similar *out-migration* ratio to that of the non-MA areas as a whole bears a significant suggestion about the usefulness of the out-migration ratio as a barometer of economic conditions. Even among the MAs one observes an apparently peculiar collection of

areas with high out-migration, including the MAs of Calgary and Edmonton (which have had marked recent economic growth and high rates of in-migration). These observations would suggest that, contrary to common lay opinion, the rate of population outflow from an area is not a good indicator of its economic condition. Account must also be taken of the counter-current of inflow, which refers right back to the much maligned net migration measures.

Another relevant comment may be made in connection with the frequently voiced complaints that some regions are losing their expensively trained 'sons' at too high a rate for their benefit. The statistics would suggest that in order to offset these losses an area might aim to develop attractions to the sons of other regions, as it may not stem the outflow of its own sons in the process of development. Of course, the statistics in question are cross-sectional while the foregoing comment pertains to longitudinal patterns, so that the indicated suggestion of the statistics must be considered weak. Yet, in the light of the legitimate public concern with the rate of outflow of the sons of the poorer regions, it would seem wise to consider the possibility that rapidly developing regions may well have relatively high rates of outflow, but their attractions are such that they experience fully compensating rates of inflow.

FOOTNOTES TO CHAPTER FOUR

[1] A distinction should be drawn between the general concept of metropolitan area and the Census Metropolitan Area defined by DBS for the tabulation of census statistics. The latter may be viewed as a rough approximation to the former (for relevant comments see Stone, 1967[a], Appendix D).

[2] No Population Sample statistics were used in the 1961 census monograph on urban development.

[3] The numerators of both ratios are, of course, the same. The denominators are also quite similar because the MAs contained 46 per cent of Canada's 1961 population (Stone, 1967[a], Table 6.1). Of course, these figures are averages for two quite heterogeneous groups of areas.

[4] It should be recalled that the figures refer to the *internal* migration of the reporting population.

[5] See Chapter Two, footnote [7].

[6] The net loss in the 20-34 age group was offset by relatively high net in-migration of older population to Victoria MA. Among the MAs, Victoria had the highest net migration ratio for persons aged 65 and over in 1961 (6.6 per cent), and the second highest net migration ratio among persons aged 45-64 in 1961

(5.0 per cent). In the latter age group the corresponding figure for Calgary MA was (6.2 per cent). Taking all MAs together, the corresponding figures for these two age groups were 1.2 per cent and 0.5 per cent, respectively.

[7] For the purposes of analysis, it is desirable to add to the incorporated centre those municipalities that form with it at least a continuous built-up area. The MAs affected include Montreal, Ottawa, Kitchener and Calgary, among others. Unfortunately the basic tabulations are such that these modifications cannot be made.

[8] See Stone, 1967[a], ch. 8, for further details.

[9] These figures were calculated from the unpublished Population Sample tabulations.

Chapter Five

PROVINCIAL MIGRATION AND DIFFERENTIAL ECONOMIC OPPORTUNITY

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5.1 INTRODUCTION AND ANALYTICAL FRAMEWORK

This Chapter considers migration at the provincial or regional level in terms of the changing balance between the distribution of population and economic opportunity within the country. The analysis is explicitly economic. Migrants are considered to be economically motivated and a part of the general economic system in a role, especially, as providers of labour services in the system of production. The underlying point of view is clearly that of an economist. The economic development of Canada, like the development of any other country, is conceived of as involving pronounced changes in the location of economic opportunities. For the economy to progress in such a context, the individuals who make up the system must respond to these locational changes as they would to any other changes. The response involves migration, often affecting large proportions of the populations of particular regions of the country.

It is fully recognized that all migration is not economically motivated. Individuals, unlike the scholars who study them, do not distinguish sharply between sources of motivation for their actions. A decision to migrate from one region to another, like any other decision that an individual might reach, is the resolution of a complicated set of influences, only some of which may be clearly economic in the sense of involving an attempt to maximize the individual's material well-being. Others, while not directly economic, may have a bearing on the individual's role in the economic system – for example, he may choose when retired from the labour force to return to his place of birth in search of companionship of old friends. Still others may be quite

unrelated to economic matters. No attempt is made here to evaluate the importance of these various influences nor does this Chapter presume any strong conclusion in favour of the predominance of economic factors. Rather, it represents one way of approaching the phenomenon; the relevance of the selected point of view can be judged only by the results of the analysis. The economic approach is pursued for several reasons, each reflecting a presumption that it will prove fruitful. In the first place, although it is known that migration involves a complex of factors, thus far there has been little success in producing analyses that display this blend. More importantly, migration is studied here in the aggregate. While migration in various directions resulting from other categories of influences might cancel out in the aggregate, economically influenced migration is more specifically in a particular direction.[1] Finally, economic theory offers a well-developed framework for analysis.

The analytical model employed here is drawn from the economic theory of resource allocation.[2] Very briefly, this model conceives of some initial allocation of the resource (in this case labour) among occupations, activities, regions, etc. Changes occur that raise the returns to labour in a particular region above those in other regions.[3] Individual workers seeking to maximize the pecuniary returns to their efforts will move to the region of greater opportunity if the returns there are higher than in their present situations. Migration will continue so long as there is a difference between regions in the earnings of labour of specified characteristics. However, this description of the model is drastically over-simplified. In the first place, it ignores uncertainty. Opportunities leading to migration are opportunities at a distance and it is probable that they are known with less surety the greater the distance. Information about returns to particular occupations in particular places does not flow freely. Indeed, there is likely to be a considerable degree of uncertainty about employment alternatives in distant regions and this certainly should deter migration. Little is known about the efficiency of the many channels through which information flows to prospective migrants. Sometimes it comes through formal employment agencies but more often through relatives and friends who have migrated previously. At any rate, labour migration, in the context of economic resource allocation, will occur only where superior alternatives are known and will be lower the weaker the the flow and the less the certainty of the information.[4] The crucial determinant of migration, then, is the expected gain to be achieved, where that expectation is held with a greater or lesser degree of uncertainty.

Costs of movement should also be considered. Geographical migration is not undertaken without costs. Some of these, but not all, will vary with distance.[5] Therefore, since increasing distance implies both increasing

costs of migration and diminishing information about opportunities, the probability of migration to nearby opportunities is likely to be higher than to distant ones. Or, to put it another way, the earnings differential necessary to induce migration must be greater for long-distance than for short-distance moves.

Finally, there may be important non-pecuniary elements to both the benefits and the costs of migration. These could be, but are not necessarily, non-economic influences. The introduction of non-pecuniary factors into the analysis requires caution. Without them the economic model may at times be naive but there is a real danger in carrying the point too far. Indeed, if all influences other than costs and returns are incorporated as non-pecuniary factors, the model becomes tautological – if migration does not occur it is necessarily because there is no net advantage to it. Such an argument is likely to preclude from the outset any real analysis of the problem. Only those non-pecuniary factors that can be objectively determined should be admitted into the analysis. The theory, then, is that individuals will move when the expected earnings that they know of in other regions exceed expected earnings in their present situation by more than the costs of movement, where earnings and costs are defined in objectively determinable but broader than just pecuniary terms.

The economic analysis of migration is appropriately set in the context of the long-term economic development of the country. Economic growth inevitably creates imbalances between the distribution of the population and the location of economic opportunities.[6] Developments that are at the very heart of economic growth – technological change and the exploitation of new resources – require a continuing redistribution of population to capture their benefits. The pace of development is such that this redistribution can seldom be achieved through differential natural increase, even if regional differences in vital rates could be expected to conform to the requirements of population redistribution. Recent research has tended more and more to emphasize the crucial role of technological change in the process of economic growth. Changing technology has a specific locational impact and there is no reason to expect that the new opportunities to which it gives rise will be distributed spatially in the same way as the existing population. The growth of income itself, as a consequence of technological change, implies structural shifts in the economy that involve a redistribution of economic opportunities.

The following analysis considers the pattern of Canadian economic development over a period of several decades and the record of migration to and from the various provinces that has been an integral part of that development. Attention is directed chiefly to the extent to which that migration is

adequately characterized as a response to regional differences in economic opportunity. An attempt is also made to assess the extent to which migration has served as an efficient reallocation of labour resources. The study proceeds in two parts. The first part is historical and considers provincial net migration by decades over the whole of the period since 1901; the methodology here is broadly interpretative and consists mainly of describing how the pattern of migration has related to the changing spatial distribution of economic opportunities over the long term. The second part utilizes a more formally specified model to analyse the pattern of inter-provincial migration in the period 1956-61, using primarily the statistics of internal migration from the 1961 Census of Canada.

5.2 THE CHANGING LOCATION OF THE FOCUS OF DEVELOPMENT IN CANADA AND ITS IMPLICATIONS FOR POPULATION DISTRIBUTION, 1901-61

Over the whole of the period 1901-61 the economic development of Canada, as measured by the growth of national product, has been rapid by international standards (cf. Kuznets, 1966 and Firestone, 1958). Over the same period the rate of growth of population has been mostly high but income per capita still has grown rapidly – as fast as in the United States and pretty much in line with the general experience of developed Western economies (cf. Kuznets, 1966). The general pattern and the driving forces of Canadian economic development are well documented and are widely known (cf. Innis, 1954; Easterbrook and Aitken, 1956; Caves and Holton, 1959; and Mackintosh, 1939). There is no need to recount the details of this development here but a brief review of its locational aspects may serve as background for the examination of regional migration.

A view with traditionally wide acceptánce among Canadian economic historians concerns the relation between national development and the emergence of a succession of staple export commodities.[7] Each of these staples involves the expansion of production in a particular set of areas, but much of the explanation that goes under the name of the "staple thesis" involves the interrelationship between the expansion of staple production in one region and its induced effects on growth in other regions. Such a model provides a convenient way to capture briefly the main implications of Canadian economic development for population movements.

Canadian development in the twentieth century is usually related to two, or possibly three, phases of staple expansion. The most clearly evident was the boom that began just before the turn of the century and lasted up to the beginning of the Great Depression in 1929. It hinged primarily on the exploitation of the wheat-growing potentialities of the previously unsettled

areas of the Canadian west. Since the wheat boom involved the settlement of new territory, it brought heavy movements of population into the wheat-growing region (cf. Easterbrook and Aitken, 1956, pp. 484 - 485; Buckley, 1955, p. 10). This rapid development of the Prairie Provinces, so the account runs, provided the main impetus of expansion in the other regions of the country. The demand in the Prairie market for both capital goods and consumer goods spurred the growth of manufacturing generally in Canada, but the regions most favoured by the induced effects of the wheat boom evidently were Ontario and British Columbia, which were producing many of the capital goods required by the investment taking place on the Prairies and elsewhere as a result of settlement and wheat production. The development of British Columbia, for example, focused overwhelmingly on lumber production, as much as 70 per cent of which went directly to the Prairie market (cf. Mackintosh, 1939, p. 47). The large volume of railway and other construction that was going on together with the agricultural investment meant strong demands for iron, steel and other metal products and machinery – goods in which Ontario apparently had a comparative advantage (cf. Caves and Holton, 1959, pp. 192 - 193). Although all of Central Canada experienced prosperity as a consequence of the wheat boom, Ontario which was producing more capital goods fared relatively better than Quebec which concentrated more on the production of consumer goods.

The Maritime Provinces did not share in the boom to the same extent as Central Canada and British Columbia. They were most distantly located from the centre of expansion and had not previously built up the base for massive industrial development. However, at least some of the prosperity spilled over into the Maritimes and for that region the early years of the wheat boom were years of considerable growth and expansion. Nova Scotia in particular, which had built up a coal and steel complex designed especially to supply materials for railway investment, fared rather well.

The first two decades of the twentieth century included the classic period of the wheat boom. By the 1920s new staple products had risen to prominence and, although expansion continued on the Prairies at a reduced rate, the primary dynamic element in national growth came to be located more and more on the forest and mining frontiers. Thus British Columbia, which had abundant resources of lumber, pulpwood and metals, experienced spectacular growth in the 1920s. Ontario, too, in addition to being the principal beneficiary of the induced effects of the boom, had a large share of the new base-metal and pulp and paper industries. Quebec seems to have fared somewhat better in this phase of the expansion when its own forest and mineral resources, bolstered by abundant hydro-electric sites, came into their own. In the 1920s, then, as one staple boom merged into another, the country continued to undergo rapid development. What is most significant

for the present purpose, though, is the changed location of the principal opportunities in this period. The magnitude of the shift may not have been great but it was a portent of things to come.

The decade of the 1930s was, in general, severely depressed. Gross national product per capita fell precipitously after 1929 and, adjusted for changes in the level of prices, did not surpass the 1929 level again until 1940. For this period the issue was not where economic opportunities lay but in which region conditions were least severe. Economic change over this period has been well documented and need not be gone into here (cf. Safarian, 1959). Suffice it to say that the depression was sharpest in the Prairie Provinces where it was conjoined with prolonged drought.

The period from 1940 to the present has been one of fairly rapid development over all and one in which there was first an adjustment to the fundamental weaknesses laid bare during the Great Depression of the 1930s and then continuing national growth. By far the greatest need for adjustment was in the agricultural region of the Prairies. Opportunities in this latest period were to be found pre-eminently in Central Canada and British Columbia and the latter region in particular experienced rapid growth. In this period also, slower growth in the Maritime Provinces was clearly evident.

The accuracy of interpreting the newest period of growth within the old framework of the staple thesis is a matter of considerable debate among economists. One is tempted to follow the lead of reputable writers who have found in the new growth pattern evidence of the dependence of the economy upon a few export staples along the lines of earlier years (cf. Caves and Holton, 1959). That viewpoint would be attractive to this study since the staple thesis points so directly to the regional focus of the growth dynamic but it would probably be wiser not to yield to temptation since the nature of Canadian development has become considerably more complex. To the staples of an earlier period – pulp and paper and base metals – would have to be added several new ones – petroleum, iron and potash. The thing one notices immediately is the more dispersed location of this variety of staple products. It is now much less clear than in previous periods that regional growth patterns are so closely linked to the main regional staples.

British Columbia has continued to experience outstanding growth, with perhaps some slowing in very recent years. Staple export commodities – base metals and forest products – are still a vital force in the development of this province but they seem less able to account for the pattern of development which that province has been following. The newest staples – iron ore in Eastern Canada and potash on the Prairies – have not yet been adequately evaluated. Much, then, depends upon how one assesses the consequence of petroleum. Clearly, Alberta has been one of the regions of rapid growth and

evidently rewarding economic opportunities. But it is less clear that the oil discoveries in that province are the principal basis of the boom there. The complex form of development now seen in Central Canada is much more difficult to link in a simple manner to the development of export staples.

Two major adjustments of population have been required by the pattern that Canadian economic development has taken in this century. There was first a large inflow of population into the Prairie region, and then a reverse movement. Throughout the century, Ontario and British Columbia have been regions of rapid growth and evident economic opportunity and as such should be expected to have continuously attracted population. The Maritime Provinces have been the disadvantaged region of the country. If population has tended to adjust to changing economic opportunities a continuing out-migration from the Maritimes should have occurred. The case of Quebec is more difficult. The level of per capita income in that province has remained distinctly below that of Ontario, yet Quebec has shared to a considerable degree in the over-all national expansion. Nor did Quebec fare as badly in the Great Depression as the Prairie region or the Maritimes. At this stage it is difficult to say *a priori* what pattern of migration should be expected for Quebec.[8]

5.3 DECADE MIGRATION PATTERNS, 1901-61

5.3.1 THE NATURE OF THE EVIDENCE – The primary evidence to be considered is the pattern of intercensal net migration for provinces for the decades 1901-11 to 1951-61 shown in Table 5.1. The estimates of net provincial migration were prepared by Leroy O. Stone, using the Life Table Survival Ratio Method (see Appendix C). There is no pretense that these are highly accurate measurements of migration, but they provide the longest consistent estimates available at present and are the only ones that give the age detail that is pertinent to this study. Where possible weaknesses in the estimates impair the analysis, these will be pointed up in the course of the study. For some purposes, Stone's estimates of net migration will be supplemented by statistics of province of birth that permit a look at the particular directions of the flow of some of the major migration streams even if only in an imprecise way.

Younger adult males constitute the main group of migrants whose motivation is directly economic. On the whole, they also comprise the greater part of male migrants of all ages. It is sensible, then, to focus on that group as well as on the migration of the whole population. Intercensal net migration ratios are shown for males aged 20-44 in Table 5.2. Since many of the migrants of other ages or of the opposite sex would be dependants of males aged 20-44, the series for migration of the whole population

(Table 5.1) will usually be highly correlated with that for males aged 20-44. On occasion, though, the two series might differ significantly (note British Columbia in the decade 1911-21). Taken as a whole, however, the broad pattern of the net migration of males aged 20-44 conforms to that for the population aged 10 and over.[9]

Table 5.1 – Intercensal Net Migration Ratios,[a] by Province, 1901-11 to 1951-61

(Data for all persons alive at the beginning of each decade)

Province	1901-11	1911-21[b]	1921-31	1931-41	1941-51	1951-61
Prince Edward Island ..	– 13.6	– 16.4	– 11.1	– 2.6	– 12.4	– 11.3
Nova Scotia...........	– 0.6	– 7.6	– 14.5	0.8	– 6.1	– 4.4
New Brunswick........	– 3.8	– 7.3	– 11.5	– 2.9	– 8.7	– 6.7
Quebec...............	4.3	– 4.0	0.9	0.1	– 0.4	5.1
Ontario...............	9.3	2.3	5.1	2.6	7.2	14.0
Manitoba..............	41.2	5.1	– 1.7	– 6.8	– 8.4	0.3
Saskatchewan.........	125.6	15.1	– 0.7	– 17.3	– 23.3	– 7.7
Alberta...............	123.8	20.9	3.8	– 5.6	– 1.0	12.9
British Columbia.......	69.4	14.8	18.7	10.7	23.9	18.7

[a] Ratios computed by means of the Life Table Survival Ratio Technique (see Appendix C). The base of the ratio is the average of the sizes of the relevant age cohort at the beginning and at the end of the decade, and the ratio is expressed as a percentage (see Appendix C).

[b] Estimates do not take into account World War I deaths or the 1918 influenza epidemic deaths.

SOURCE: Same as Appendix Table C.2.

Table 5.2 – Intercensal Net Migration Ratios[a] for Males Aged 20-44 at the End of Each Decade, by Province, 1901-11 to 1951-61

Province	1901-11	1911-21[b]	1921-31	1931-41	1941-51	1951-61
Prince Edward Island..	– 46.6	– 40.5	– 23.5	– 5.6	– 26.7	– 23.7
Nova Scotia..........	– 12.8	– 18.5	– 26.7	0.9	– 13.8	– 7.0
New Brunswick.......	– 17.4	– 17.2	– 22.8	– 4.4	– 19.6	– 11.5
Quebec..............	3.3	– 9.9	2.4	– 2.2	– 3.0	8.8
Ontario..............	13.2	– 2.3	10.3	2.5	9.4	22.5
Manitoba.............	62.9	2.2	1.9	– 12.4	– 13.8	3.9
Saskatchewan........	151.0	11.7	6.5	– 25.4	– 32.0	– 10.9
Alberta..............	147.8	18.2	15.1	– 8.1	– 0.2	22.6
British Columbia......	93.0	2.1	29.6	12.3	26.1	28.7

[a] See Table 5.1, footnote [a].
[b] See Table 5.1, footnote [b], and footnote [15] to the text.

SOURCE: Same as Appendix Table C.2.

5.3.2 THE BROAD PATTERNS – Looking broadly at the experience of the whole century, Ontario and British Columbia have consistently been net gainers through migration and the Maritime Provinces have quite consistently had net out-migration. The Prairie Provinces experienced large net in-migration in the early decades of the century, which sharply reversed into heavy net out-migration until the most recent decade. This over-all pattern of migration broadly reflects the changing focus of economic opportunity described above. But there is surely nothing novel in this and if the present analysis is to prove its worth it must move considerably farther. Since the main areas of opportunity have changed over time (notably the situation of the Prairie region), the following discussion is directed separately to the pattern of migration in three periods. These periods, corresponding to the phases in national development in the twentieth century discussed in Section 5.2, are: (a) 1901 - 31 – the period of western settlement; (b) 1931 - 41 and 1941 - 51 – depression and recovery; and (c) 1951 - 61 – continuing national growth.

5.3.3 MIGRATION IN THE PERIOD OF WESTERN SETTLEMENT, 1901 - 31 – The first two decades, and especially the first, were dominated by the settlement of the Prairie Provinces. The decade 1921 - 31 was a period of transition during which the settlement process appears to have been reversed in Manitoba and Saskatchewan but in which Alberta continued to have positive net migration.[10] Migration to British Columbia was large during the first decade of the century but dropped sharply in 1911 - 21; this was especially pronounced in the series for males aged 20 - 44. Net migration to British Columbia continued again at a high rate in the 1920s. The Maritimes lost population through migration but both Ontario and Quebec made substantial gains. However, the rates of in-migration to Ontario and Quebec were well below those of the western provinces.

A point to bear in mind through the analysis of inter-provincial migration is that the massive movement of people into the Prairie region during the early years of the twentieth century was only in part a migration of the Canadian-born population. Indeed, that may have been the lesser part. It is well known that a great number of settlers came directly from other countries. To the extent that immigrants rather than internal migrants comprised the dominant component of net provincial migration, analysis of the latter in terms of the relative attractiveness of the several economic regions of Canada becomes complicated. It would be quite possible, and consistent with rational economic behaviour of migrants, for net internal migration and migration from abroad to be poorly correlated. As yet there are no very good measures available of internal migration of the Canadian-born alone. However, if the appropriate qualifications are observed,[11] use might be made of statistics of province of birth along lines explored by Buckley, 1962. These crude estimates of the internal migration of the Canadian-born are presented

in Table 5.3. The provincial gains, over intercensal periods, of migrants from abroad, shown in Table 5.4, are available only for the decades beginning with 1911-21. For the most important decade of western settlement there is, unfortunately, not much of a record from which to estimate the magnitude of international migration ot the region.

Table 5.3 – Intercensal Net Change[a] in Canadian-Born Population Residing Outside the Province of Birth, by Province of Residence, 1901-11 to 1951-61

Province of residence	1901-11	1911-21	1921-31	1931-41	1941-51	1951-61
	'000	'000	'000	'000	'000	'000
Prince Edward Island ..	− 6	− 3	1	b	− 6	− 7
Nova Scotia...........	− 11	− 6	− 10	5	− 27	− 35
New Brunswick	− 9	− 1	− 6	− 5	− 29	− 26
Quebec	− 27	− 15	25	26	− 11	10
Ontario	− 148	− 3	51	100	155	113
Manitoba	− 14	− 19	− 36	− 34	− 57	− 35
Saskatchewan.........	175[c]	9	− 42	− 115	− 150	− 93
Alberta		21	− 13	− 29	− 7	29
British Columbia	41	16	30	52	132	51

[a] Let k represent a province listed in the column headings and j represent the rest of Canada. The figure shown in one cell, in the relevant column, is calculated as j-born residents of k at the end of the decade *minus* the j-born residents of k at the beginning of the decade.

[b] Less than 1,000.

[c] Separate figures for Saskatchewan and Alberta are not available for 1901.

SOURCES: 1951 Census, Vol. I, Table 45; 1961 Census, DBS 92-547, Table 49.

Table 5.4 – Immigrants[a] Since the Preceding Decennial Census, by Province of Residence, Census Years 1901-61[b]

Province	1901	1921	1931	1941	1951	1961
	'000	'000	'000	'000	'000	'000
Prince Edward Island ..	1	1	1	2	1	1
Nova Scotia	10	20	15	14	7	12
New Brunswick	5	10	10	7	5	7
Quebec	35	83	100	34	63	209
Ontario	44	296	299	78	228	664
Manitoba	37	87	64	9	23	47
Saskatchewan.........	48[c]	125	85	8	13	21
Alberta		126	98	15	36	96
British Columbia	43	107	79	22	45	140

[a] Includes Canadian-born persons returning from residence in other countries.

[b] Data for 1911 not available.

[c] Separate figures for Saskatchewan and Alberta are not available for 1901.

SOURCES: 1901 Census, Vol. I, Table XVI; 1951 Census, Vol. I, Table 50; 1961 Census, DBS 92-548, Table 58.

For the decade 1901-11, a very rough calculation can be made that indicates that migration from abroad to the Canadian prairies probably outweighed migration from other parts of Canada. This calculation uses census data on the numbers of foreign-born, by province, without regard to when they might have migrated to Canada. The computation is far from exact since some of the foreign-born would have died during the decade and many others would have been involved in internal migration. Nor are the data on intercensal changes in foreign-born directly comparable with census statistics on immigration. In the decade under consideration, the internal migration of previous immigrants was undoubtedly significant and greatly complicates the interpretation of changes in numbers of foreign-born as immigration. For example, between 1911 and 1921 – for which period census statistics of immigration are available – the increase in the number of foreign-born in Saskatchewan was 199,000, well above the 125,000 immigrants recorded as having arrived since 1911.[12] Ontario, which was losing foreign-born population to the areas of western settlement as well as through death, had a gain in foreign-born of only 182,000 but had 299,000 immigrants. Setting aside these limitations to the statistics, the indication is that the Prairie region between 1901 and 1911 had a gain of foreign-born of 300,000 as contrasted with a gain in Canadian-born from other provinces of 190,000. Migration of natives out of the region would have been small in this period. To other parts of Canada, mainly British Columbia, it was about 10,000 and one could guess that emigration was not much more. In the succeeding decade, emigration of both Canadian and foreign-born was greater and the calculation of the components of population redistribution becomes more difficult. However, in comparison with a gross immigration of over 300,000, the gross in-movement from other provinces was less than 40,000. Although subject to a considerable margin of error, these calculations suggest that immigration rather than migration from other provinces was the leading element in western settlement.

The significant issue that must be raised, but is resolved neither here nor elsewhere in this study, is whether to some unknown degree immigration and internal migration are substitutes. It is conceivable that, given the economic opportunities existing in Western Canada, the flow into the area from the provinces to the east would have been even greater if the volume of immigration had not been so high.[13] The problem is a serious one for the interpretation of net provincial migration as an adjustment of population to altered economic opportunities, with an emphasis on the domestic population.

In any event, the outstanding feature of the period 1901-31 with regard to the pattern of migration is a flow of population into the western regions that far exceeds any migration since that time.[14] The movement took place

mainly in the first two decades of the period, the third decade being largely a period of consolidation and transition. In parts of the Prairie region (notably the Peace River District), settlement was still going on in the 1920s; in other parts of the region the reversal had begun.

Net migration was negative for the Maritime Provinces throughout the period of western settlement. The negative net migration from Nova Scotia and New Brunswick was remarkably mild in 1901 - 11 and also in 1911 - 21 if the estimates for that decade are admitted to have a downward bias.[14] Net out-migration did not really mount until the 1920s when it became quite substantial. The ratio for New Brunswick, for example, was four per cent in the first decade of the century but rose to 12 per cent by the 1920s. The pattern for males aged 20 - 44 was not quite as pronounced as for the whole population. For Prince Edward Island on the other hand, the net out-migration ratio was high (absolutely throughout the period and tended to be higher in the first two decades than in the 1920s.

The record for Quebec during the period of western settlement poses a number of puzzles. For none of the three decades was net migration large relative to population, at least in comparison with the experience of other provinces, but the positive net migration ratio of four per hundred population achieved in the first decade of the century was well above that of any other decade until 1951 - 61 (Table 5.1). The net migration ratio fell in the 1911 - 21 decade to a negative figure of about four per hundred and in 1921 - 31 it appears to have risen again but remained below the level of 1901 - 11. The pattern for males aged 20 - 44 is similar but on a reduced scale.[15] The pattern raises suspicions but it must be kept in mind that the estimates may not be adequate to support any interpretation of their movement. For all of this period the net migration ratios for Quebec are so low that, given the possible errors of estimation, they may not be significantly different from zero. War deaths and the consequences of the influenza epidemic of 1918, as has been noted, have not been taken into account in estimating the migration ratios of Tables 5.1 and 5.2; thus the estimates for that decade are probably biased downward for all provinces.[16] Whether that bias may be relatively greater for Quebec could only be a guees. Although it is interesting that estimates of internal migration based on statistics of province of birth (Table 5.3) do not indicate a fall in Quebec net migration during 1911 - 21 and data on French-language, Canadian-born in the United States do not indicate an accelerated emigration from Quebec, these points do not constitute a real test of the estimates for Quebec.[17] The validity of the fall in net migration for Quebec in the 1911 - 21 decade cannot be evaluated at this time but if the apparent pattern for the first three decades of the century is genuine it raises problems of interpretation. The record of differential regional economic development in Canada offers little in the way of an explanation of such a pattern.

The pattern of migration for British Columbia over the period of western settlement is also something of an enigma. In the decade 1901 - 11, British Columbia was participating fully in the generally voluminous in-migration to the west. Then, in the succeeding decade, net migration fell sharply. This was especially noticeable for males aged 20 - 44 for whom net migration fell almost to zero. Although the problem of bias exists here as it did for Quebec, the fall in British Columbia is supported by other evidence. The rate of growth of employment in British Columbia fell almost to zero during the decade in question. Net migration to British Columbia picked up again in the decade 1921 - 31 when this province, along with Ontario, became a chief region of gain.

5.3.4 DEPRESSION AND RECOVERY, 1931 - 41 AND 1941 - 51 – The principal consequences of the Great Depression were generally reduced migration and a marked alteration of the pattern of previous decades. The Prairie region ceased to be an area of attraction to migrants and became the leading area of out-migration. The division of the period, on the basis of decennial census intervals, does not exactly fit the timing of depression and recovery. The depression was well under way by 1931. Indeed by 1931 it was close to its depth. However, recovery had not proceeded far by 1941 and the entire decade 1931 - 41 can aptly be described as depressed (cf. Safarian, 1959). By contrast, the decade 1941 - 51 was thoroughly prosperous. The recovery referred to in the designation of this period is not the more usual recovery from the depths of depression – achieved in this case by about 1940 – but the readjustment to the more fundamental weaknesses that the depression had revealed. This process of readjustment, particularly as it concerns the changed position of the Prairie region, is the most marked feature of the pattern of migration during the two decades.

The outstanding feature of the period of depression and recovery is the marked reversal of net migration for the Prairie Provinces. The net inflow to the Prairies had pretty well run out by the 1920s and in the 1930s it turned into a heavy out-migration which continued into the decade of the 1940s and gained in volume. In both the depression and recovery decades, Ontario and British Columbia continued to be the regions that experienced large gains in population through migration. In the former decade net migration from the Maritime Provinces fell to insignificance but in the succeeding decade it reverted to rates of negative net migration that ranged from the modest figure of six per cent for Nova Scotia to the more substantial level of 12 per cent for Prince Edward Island. In 1931 - 41, Quebec net migration fell to close to zero and did not change appreciably in the following decade. The interpretation of the experience of Quebec through these two decades must be somewhat different. Net migration remained close to zero in 1941 - 51 despite rather substantial immigration. By implication the migration of

native-born from Quebec either to other provinces or to the United States must have increased.[18]

5.3.5 CONTINUING NATIONAL GROWTH, 1951-61 – The most recent decade suggests the emergence of a new pattern of migration in Canada. The Prairie region may have achieved a complete adjustment to the fundamental problems laid bare by the depression. The process was perhaps slower in Saskatchewan which still experienced net out-migration in 1951-61.[19] Manitoba's net migration fell to about zero and Alberta emerged as a new and important area of net gain. British Columbia and Ontario continued to be the chief areas of net gain; in this decade the net in-migration ratio for Ontario was the highest observed for any intercensal period in the twentieth century. Net out-migration from the Maritime Provinces continued, although only for Prince Edward Island did the ratio exceed 10 per cent in absolute value. Finally, Quebec emerged for the first time since 1901-11 as a substantial net gainer through migration, although the ratio (five per cent) was not especially high.

Once again it is necessary to emphasize the role of immigration from other countries. For many provinces, by far the larger part of net migration is accounted for by immigration. For example, in 1951-61, province of birth statistics indicate a very small net inflow to Quebec from other provinces; the large positive net migration for Quebec results almost entirely from immigration. In Manitoba there may have been a net loss to other provinces that was more than offset by a high level of immigration.

5.4 AN INTERPRETATION OF THE DECADE MIGRATION PATTERNS, 1901-61

The intent of this Chapter is to interpret the migration patterns described in the foregoing Sections in terms of the adjustment to differential economic opportunities. The analytical framework for the primary task was outlined in Section 5.1 and the procedure followed involves a rather straightforward historical discussion, fitting the evidence to the model in a relatively unsophisticated way. As need arises, a variety of evidence is called upon for the purposes of the analysis. The more formal approach of actually fitting a model by statistical techniques is left to Section 5.5 where the problem is narrowed to proportions that are more manageable in that way.

In the present part of the study, differential economic opportunities are viewed primarily as emerging from conditions in the labour market. Three objective indicators are used – regional levels of per capita income, regional differences in shifts of workers from "rural" to urban/industrial occupations, and the ratio at the beginning of the decade of males aged 10-19 to

the male labour force. Per capita income is a reasonably comprehensive indicator of economic well-being. Structural change gives some indication of changing conditions of demand in the labour market. The third indicator is used to represent likely pressures on supply of labour in the period studied.

For years prior to 1926 the only statistics available for income per person are for five major regions of the country rather than for nine provinces. For the early years, then, it is necessary to aggregate the migration statistics for provinces within the Maritime and Prairie regions. The provinces within these two regions had similar income and migration characteristics in the period involved. This can be seen from a comparison of the migration estimates of Table 5.1 for the individual Maritime and Prairie provinces with the figures for the two regions shown in Table 5.5. Because of this general homogeneity of the provinces making up the two regions that are groups of provinces, the analysis is directed mainly to major regions rather than to individual provinces. For more recent decades, the focus is shifted to individual provinces in the Maritimes or Prairies only when it enhances the analysis.

Table 5.5 – Net Migration Ratios[a] for Population Aged 10 and Over and Males Aged 20-44 at the End of Each Decade, Maritime and Prairie Regions, 1901-11 to 1951-61

Period	Maritimes[b]		Prairies[c]	
	Population, 10 and over	Males, 20-44	Population, 10 and over	Males, 20-44
1901-11	− 2.7	− 17.5	72.5	118.4
1911-21[d]	− 7.2	− 19.6	11.3	11.0
1921-31	− 11.6	− 24.7	− 0.3	8.0
1931-41	− 0.8	− 1.9	− 9.4	− 16.1
1941-51	− 6.7	− 16.9	− 9.9	− 15.3
1951-61	− 5.1	− 9.8	2.3	7.2

[a] See Table 5.1, footnote [a].

[b] Prince Edward Island, Nova Scotia, New Brunswick.

[c] Manitoba, Saskatchewan, Alberta.

[d] Estimates do not take into account World War I deaths or the 1918 influenza epidemic deaths; see footnote [15] to text.

SOURCE: Same as Appendix Table C. 2.

5.4.1 REGIONAL AND PROVINCIAL INCOME DIFFERENTIALS – The only comprehensive study of regional levels of income in Canada that comes anywhere near to covering the period for which migration is being studied here is that undertaken by the present author (cf. McInnis, 1968). The basic

long-term series of that study is given in Table 5.6 and is used as the source of regional per capita income differentials for the subsequent analysis. The statistics of Table 5.6 refer to participation income rather than to the more comprehensive measure of personal income. Participation income includes only wages and salaries and the net income of unincorporated business.[20] It differs from personal income by the exclusion of investment income and government transfer payments. Participation income is all that could be estimated for years prior to 1926. However, since it includes those components of personal income that are most clearly dependent upon a particular location, it might be argued that participation income is the preferable measure for the analysis of migration. In this particular application there is no real issue since the differences between regional relative levels of participation income and personal income are insignificant.

Table 5.6 – Average Annual Participation Income[a] per Capita, by Major Regions, 1910-11 to 1960-62

Period	Canada	Maritimes	Quebec	Ontario	Prairies	British Columbia
	Participation income per capita in dollars					
1910-11	249	159	191	261	315	464
1920-21	430	298	362	465	501	520
1930-32	290	208	272	358	218	398
1940-42	423	291	374	515	370	537
1950-52	952	615	777	1,121	1,018	1,117
1960-62	1,241	833	1,087	1,465	1,229	1,434
	Income relatives (Canada = 100)					
1910-11	100	64	77	105	127	186
1920-21	100	69	84	108	117	121
1930-32	100	72	94	123	75	137
1940-42	100	69	88	122	87	127
1950-52	100	65	82	118	107	117
1960-62	100	67	88	118	99	115

[a] Participation income, sometimes referred to as earnings from employment, is the sum of wages and salaries and the net incomes of farm and non-farm unincorporated business.

SOURCE: McInnis, 1968, Table 2.

A quick survey of the regional income differentials shown in Table 5.6 indicates that regional net migration in Canada has generally been closely related to the relative levels of regional income. Roughly speaking, it is easy to find support for an economic interpretation of regional migration. A concise way to consider the relationships between regional net migration and levels of income per capita is through the rank correlations of

the two. Table 5.7 presents Spearman rank correlation coefficients between provincial net migration of males aged 20-44 and levels of participation income per capita.[21] Also shown are the correlations of migration with the other variables described above. The interpretation of these rank correlations is undertaken at a later juncture. Suffice it to say here that, on the whole, migration is highly correlated with relative levels of income. The only exception to that generalization is the decade of the 1930s.

Table 5.7 – Spearman Rank Correlation Coefficients Between the Net Migration Ratio[a] for Males Aged 20-44 at the End of Each Decade and Selected Variables, Provinces, 1901-11 to 1951-61

Selected variables	1901-11	1911-21	1921-31
Per capita participation income at the beginning of the decade[b]	c	1.00 d	0.90d
Per cent of the work force in non-agricultural activity at the beginning of the decade	e	e	e
Per cent change in non-agricultural employment during the decade	0.98d	e	0.70
Ratio of males aged 10-19 to the total male work force at the beginning of the decade	e	− 0.75	− 0.75
	1931-41	**1941-51**	**1951-61**
Per capita participation income at the beginning of the decade[b]	e	0.93	0.85
Per cent of the work force in non-agricultural activity at the beginning of the decade	0.76	0.76	e
Per cent change in non-agricultural employment during the decade	e	e	e
Ratio of males aged 10-19 to the total male work force at the beginning of the decade	e	e	− 0.72

a See Table 5.1, footnote a.

b See Table 5.6, footnote a.

c No data available on regional participation income in 1901.

d Based on five regions only. The 1911-21 figure is significantly different from zero at the 10 per cent level.

e Not significantly different from zero at the 10 per cent level of statistical significance.

SOURCES: Tables 5.2, 5.6, 5.8, 5.9 and 5.10.

5.4.2 DIFFERENTIAL RATES OF 'INDUSTRIALIZATION' – It is worth exploring some alternatives to relative levels of income as measures of differential economic opportunities. Although per capita income levels may

be conceived as the simplest and most comprehensive indicator of economic opportunity, in practice other variables may add to the explanation of migration. Under some conditions regional income levels may lag behind the changes occurring in differential opportunity. Studies of migration over short-term periods frequently find that variables reflecting the relative price of labour, such as wage rates, provide relatively poor explanations. Similarly, income levels may not change sufficiently in the short run to be able to account very well for changes in rates of migration. However, this should not be a problem with analysis of periods of decade length.[22] Other indicators of economic opportunities should at least be given consideration.

One alternative indicator of economic opportunities is the extent of structural change that a region is undergoing. What for want of a better title might be called 'industrialization' is introduced here to denote the shift of workers from predominantly rural occupations, such as farming and fishing, to predominantly urban occupations. The latter include not only 'industrial' occupations in a narrow sense but also those in the service sector.[23] A marked shift of workers out of rural occupations, or what might be called 'agriculture', into 'industrial' occupations is widely agreed to be one of the prominent features of economic development (cf. Kuznets, 1966; Clark, 1959). Except during the early period of western settlement, the extent of the shift of workers from agricultural to industrial occupations might be taken as an indicator of changing economic opportunities.

The use of 'industrialization' as a measure of economic opportunity might take either of two forms. The best opportunities might be expected to lie in those regions that at the beginning of the decade under consideration have the highest proportions of their workers in non-agricultural occupations. Alternatively, the rate of growth of employment in non-agricultural occupations over the course of the decade might be expected to be a stronger indicator. The latter implies a shorter lag and might also be preferable if the intention is to get at something a little more dynamic so as to reflect changes in job opportunities that are not brought out in the income measure. Correlation coefficients between rates of net migration and both of these indicators of 'industrialization' are shown in Table 5.7. The measures themselves are presented in Tables 5.8 and 5.9.

Both measures of 'industrialization' are more weakly related to net migration than are relative levels of income. It should be no surprise that it is only after the period of settlement that relationships between migration and industrialization are obtainable that come anywhere near being significant. In the early period it is known that attractive opportunities lay in the western provinces which were predominantly agricultural, and in agriculture itself. For the more recent decades, however, the rather weak performance

Table 5.8 – Per Cent of the Work Force[a] in Non-agricultural Occupations,[b] Canada and Provinces, 1901-61

Province	1901	1911	1921	1931	1941	1951	1961
	Per cent of the work force						
Canada	**58.3**	**64.4**	**66.4**	**70.0**	**72.9**	**83.4**	**89.4**
Newfoundland	c	c	c	c	c	79.3	91.2
Prince Edward Island	33.2	33.9	36.7	38.5	41.6	56.4	66.9
Nova Scotia	56.0	63.4	66.9	69.4	74.7	84.8	91.5
New Brunswick	53.5	59.4	62.5	63.8	68.6	81.5	90.8
Quebec	60.9	68.0	71.6	77.1	77.9	86.3	92.3
Ontario	59.1	68.6	73.5	76.9	81.0	89.0	92.7
Manitoba	44.5	60.5	59.8	64.0	63.3	74.7	82.1
Saskatchewan	33.0[d]	35.3	34.3	39.1	39.8	50.7	62.9
Alberta		49.6	47.0	48.3	49.9	67.2	78.5
British Columbia	84.6	85.9	81.9	82.7	83.7	92.4	94.9
	Relative levels (Canada = 100)						
Canada	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Newfoundland	c	c	c	c	c	95	102
Prince Edward Island	57	53	55	55	57	68	75
Nova Scotia	96	98	101	99	102	102	102
New Brunswick	92	92	94	91	94	98	102
Quebec	104	106	108	110	107	103	103
Ontario	101	107	111	110	111	107	104
Manitoba	76	94	90	91	87	90	92
Saskatchewan	57[d]	55	52	56	55	61	70
Alberta		77	71	69	68	81	88
British Columbia	145	133	123	118	115	111	106

[a] Work force refers to gainfully occupied for the years 1901 to 1941 and to the labour force for 1951 and 1961.

[b] Occupations other than farming and fishing.

[c] Not available.

[d] Separate figures for Saskatchewan and Alberta are not available for 1901.

SOURCES: 1951 Census, Bul. SP – 8, Table 5; 1961 Census, DBS 99-522, Table 2.

of this variable is a little surprising. Only in two decades (1931-41 and 1941-51) is migration clearly correlated with the proportion of the work force in non-agricultural occupations at the beginning of the decade. The growth of employment variable fares even less well. The high correlation between this latter variable and migration in the first decade of the century points up the weakness of the variable for analysis of this kind. Rates of growth of non-agricultural employment will be relatively high because migration is high. This shows up especially clearly in the decade 1901-11 when employment generally was expanding rapidly in the western regions,

especially non-agricultural employment (despite the fact that the settlement was agriculturally based).

Table 5.9 – Per Cent Change of Work Force,[a] Canada and Provinces, 1901-11 to 1951-61

Province	1901-11	1911-21	1921-31	1931-41	1941-51	1951-61
	Total work force					
Canada	**52.8**	**16.2**	**23.9**	**7.0**	**23.4**	**22.2**
Newfoundland	b	b	b	b	b	5.5
Prince Edward Island	- 5.0	- 2.9	3.6	- 2.8	9.4	c
Nova Scotia	11.7	6.8	- 2.3	5.6	15.6	7.2
New Brunswick	7.0	10.5	5.5	5.1	15.1	5.5
Quebec	27.5	19.5	30.9	16.3	23.8	20.1
Ontario	31.4	12.7	20.5	8.1	29.5	27.0
Manitoba	106.9	21.4	25.1	- 1.8	12.4	14.8
Saskatchewan	668.3[d]	27.6	27.3	- 6.8	- 4.3	7.8
Alberta		33.7	32.4	0.7	22.9	38.3
British Columbia	153.4	6.5	39.4	2.5	41.6	30.0
	Non-agricultural work force[e]					
Canada	**69.0**	**19.6**	**30.8**	**11.4**	**23.3**	**31.1**
Newfoundland	b	b	b	b	b	21.4
Prince Edward Island	- 3.1	5.1	8.6	5.1	48.3	18.8
Nova Scotia	26.4	12.6	1.4	13.7	31.2	15.8
New Brunswick	18.9	16.2	7.8	12.9	36.9	17.5
Quebec	42.3	25.9	40.9	17.4	37.3	28.4
Ontario	52.6	20.6	26.1	13.9	42.4	32.1
Manitoba	181.2	19.9	34.1	- 2.9	32.7	26.1
Saskatchewan	873.8[d]	24.4	44.3	- 9.5	21.8	33.7
Alberta		26.6	36.2	4.0	65.4	61.7
British Columbia	157.3	1.6	40.7	3.8	56.2	33.5

[a] See Table 5.8, footnote [a].
[b] Not available.
[c] Virtually zero.
[d] Separate figures for Saskatchewan and Alberta are not available for 1901.
[e] Occupations other than farming and fishing.

SOURCES: Same as Table 5.8.

In one case however, the growth of employment in non-agricultural occupations may provide a useful supplement to income differentials as a factor explaining regional migration. This is the decade 1921-31 when, as explained below, regional differences in per cent growth of non-agricultural employment may throw additional light on the basis of the pattern of migration.

5.4.3 POPULATION PRESSURE – It is widely recognized that there have been pronounced differences among Canadian provinces in rates of natural increase of population.[24] These probably entail varying degrees of pressure on labour supply among the provinces. So far, the explanation of migration as a response to differential economic opportunity advanced in this study has tended, at least implicitly, to emphasize factors affecting regional demands for labour. Admittedly, both income differentials and growth of industrial employment are *ex post* measures that reflect the influences of both demand and supply. But the use of base-period income and industrialization puts the emphasis on demand.

It is perhaps appropriate to focus first on demand factors since the author's view of economic development is that it is the large changes occurring in the distribution of the demands for labour that are primarily responsible for the need for population redistribution. However, this should not preclude consideration of the possibility that influences on the supply side might also be significant. Indeed, regional differences in the pressure of labour supply are found to provide a useful supplement to income differentials. Economic opportunities in one province may be less promising than elsewhere because of past population increases and greater competition in the labour market from new entrants. Moreover, the extent of this sort of population pressure may have varied over time in the several provinces so that the effects of labour supply may have varied from decade to decade. Farrar, 1962, examined the relationship between migration and prior natural increase as an indicator of population pressure; he found these to be negatively related, as might be expected, but not very strongly. The natural increase of the previous decade should not show up strongly, however, as pressure on the supply of labour in the present decade.

A longer lag is appropriate, however. A conceptually superior and more readily available indicator of prospective pressure from new entrants into the labour market is the ratio of males 10-19 years of age to total male workers at the beginning of the decade (Table 5.10). The extent of variation in the ratios is almost surprising. Even otherwise similar provinces exhibit substantial differences in the relative magnitudes of the potential increase in the supply of labour. In 1951, for example, the ratio for Saskatchewan was more than 10 per cent above that of either Alberta or Manitoba. In half of the decades under consideration the negative rank correlation between this ratio and provincial net migration rates is significantly greater than zero at the 0.05 level of statistical significance. In one other decade (1941-51) the correlation falls only slightly short of such significance. Of the two periods for which there is no significant correlation, one is the first decade of the century when the locations of demands for labour were changing so dramatically that the influence of any supply variable would surely be swamped

and the other is 1931-41, the depression decade for which neither income differentials nor labour supply provides a good explanation of the pattern of migration.[25]

Table 5.10 – Male Population Aged 10-19 as Per Cent of the Total Male Work Force,[a] Canada and Provinces, 1901-61

Province	1901	1911	1921	1931	1941	1951	1961
	Per cent of the total male work force						
Canada	**37.5**	**30.0**	**32.3**	**32.9**	**33.3**	**26.9**	**35.5**
Newfoundland	b	b	b	b	b	37.7	58.1
Prince Edward Island	42.2	38.9	34.5	34.1	36.5	31.8	41.3
Nova Scotia	37.4	35.0	35.3	36.5	36.8	31.1	41.3
New Brunswick	39.3	37.5	37.2	39.1	40.8	34.2	48.3
Quebec	42.6	39.0	40.2	37.6	38.5	31.1	40.4
Ontario	35.9	29.2	29.0	29.7	29.5	22.6	30.9
Manitoba	36.7	29.0	33.1	34.5	32.8	25.5	33.5
Saskatchewan	41.5[c]	23.1	30.8	35.7	35.5	28.7	34.4
Alberta		23.0	28.6	31.0	31.5	26.4	32.2
British Columbia	18.3	15.3	21.6	23.7	24.8	21.8	31.8
	Relative levels (Canada = 100)						
Canada	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Newfoundland	b	b	b	b	b	140	164
Prince Edward Island	113	130	107	104	110	118	116
Nova Scotia	100	117	109	111	111	116	116
New Brunswick	105	125	115	119	123	127	136
Quebec	114	130	124	114	116	116	114
Ontario	96	97	90	90	89	84	87
Manitoba	98	97	102	105	98	95	94
Saskatchewan	111[c]	77	95	109	107	107	97
Alberta		77	89	94	95	98	91
British Columbia	49	51	67	72	74	81	90

[a] See Table 5.8, footnote [a].
[b] Not available.
[c] Separate figures for Saskatchewan and Alberta are not available for 1901.
SOURCES: 1961 Census, DBS 92-542, Table 20, and DBS 94-501, Table 1.

The measure of potential increases in supply of labour is not related to migration at all as strongly as regional levels of income and it should in no sense be regarded as a substitute for income differentials. It is clear enough that any discussion of migration within the framework of an economic model must start with income differentials, but other variables may be useful in rounding out the explanation. In the Canadian case, as shown in the

analysis to follow, regional differences in the extent of pressure on labour supply is one of these.

The following Sections incorporate the variables discussed above – income differentials, pressure on labour supply and 'industrialization' – together with more general descriptions of the features of economic development in an interpretation of the changing pattern of regional net migration over each of the periods of western settlement, depression and recovery and continuing national growth. With five regions or with nine or ten provinces, it makes no sense to attempt formal statistical analysis. The influences of the variables that have heretofore been considered separately are blended instead in a more general, impressionistic interpretation.

5.4.4 INTERRELATIONS IN THE PRINCIPAL PERIOD OF SETTLEMENT, 1901-11 AND 1911-21 – Regional net migration in this period was dominated by the movement of population to exploit the opportunities offered in the new lands of the western provinces. By any historical comparison in Canada, the movement was huge. In the first decade of the century the net migration of males aged 20-44 to each of the western provinces exceeded the number of males of those ages residing in the area at the beginning of the decade. This agricultural settlement and the development of a whole system of urban centres that accompanied it was a forward-looking thing. It must far surpass anything that objective measures such as income levels would indicate. But this is not to deny that the opportunities were there and were appreciated by the settlers. The history of settlement has been well documented and there is no need to dwell at length on this feature of the pattern of migration.

The data that are available on income levels support the view that Western Canada was a leading area of economic opportunity in the first two decades of the twentieth century, although they fall short of indicating the extent of the opportunities as they must have been perceived by the settlers. The income statistics presented in Table 5.6 pertain only to 1910-11, although it is unlikely that the differentials for 1901 differed much.[26] Even making a rough mental adjustment for the undoubtedly higher level of prices in the western regions, one cannot avoid the conclusion that incomes in British Columbia and the Prairies were clearly above those in the older regions of the country. The attraction of British Columbia is most evident in the level of per capita income – 86 per cent above the national average in 1910-11.[27] On the other hand, the relative attractiveness of the Prairie region is probably understated by the income statistics. In the first place, the relatively high level of wage and salary earnings in Saskatchewan and Alberta was found despite sparse representation of many of the higher paying occupations. Greater relative numbers of workers appeared in high-level jobs only as the structure of the region evolved.

It must also be recognized that for the Prairies, as well as for British Columbia, the attraction did not lie only in the higher level of earnings that could be immediately obtained. To a considerable degree, the huge movement of settlers into the region must have reflected the expectation of the migrants that opportunities would continue and possibly even improve in the future.

Finally, and perhaps most importantly, there was free land. Both to immigrants and to the settlers from the eastern provinces, the offer of a homestead was the crowning attraction of the Prairie region.[28] Higher rates of net migration to Saskatchewan and Alberta than to Manitoba directly reflect the search for free land, since by 1901 there was little homestead land still available in Manitoba. Free land gave to many the prospect of a long-term future in the prosperous surroundings of an area of great agricultural potential, which was keenly appreciated by the settlers. As many writers have shown, the flow of immigrants into the area varied from year to year in close correspondence with the price of wheat. Those migrants who did not see in free land a long-term future of prosperity at least foresaw the prospects of handsome gains to be made from proving homesteads that could later be sold at rewarding prices. In one way or another the attraction of the Prairies to migrants during the first two decades of the twentieth century is not hard to appreciate.

A more perplexing issue that tries the economic model of migration more severely concerns the distribution by province of origin of Canadian-born migrants to the western provinces. The Canadian-born settlers of Saskatchewan and Alberta came overwhelmingly from Ontario, a fact that can be determined in a sufficiently accurate way from the statistics on province of birth. On the basis of intercensal changes in numbers of persons born in provinces other than their province of residence, it may be concluded that during the decade 1901 - 11 Saskatchewan received 70 per cent of its Canadian-born settlers from Ontario.[29] Quebec sent only 10 per cent, fewer than Manitoba which was the province of birth of 15 per cent. Canadian-born in-migrants who originated in the Maritime region were only five per cent of the total. The pattern for Alberta was similar to that of Saskatchewan.

A straightforward application of the economic theory of resource allocation to the objective evidence of income differentials, labour supply and industrialization would not seem to lead to a conclusion that the movement to the west would come mainly from Ontario. The income differential between Quebec and the Maritimes and the western regions was surely greater than that for Ontario. Of course, the distance from Quebec and the Maritimes to the Prairies was greater and so the costs of movement would have been

higher but that difference must have been slight relative to the gains that were to be made. Moreover, costs did not seriously deter migrants from other countries, judging by the size of the inflow of immigrants.

A ready explanation lies in the cultural differences among people of the eastern provinces. Certainly the movement from Quebec to the Prairies was much smaller in relation to the population of Quebec than even that from the Maritimes. The desire of the people of Quebec to live in familiar surroundings with assurances of their language and religion cannot be wholly neglected. Cultural factors such as these, however, lie outside the purview of the economist who takes as his task the assessment of the economic determinants and consequences of such phenomena as migration. The author, in his capacity as an economic analyst, would like to suggest, without implying any denial of the operation of cultural and other social influences on migrants, that economic influences may also have worked in the direction of providing a greater inducement for people to migrate from Ontario than from Quebec. In addition, there may have been a stronger attraction for out-migrants from Ontario to move to Western Canada than for out-migrants from Quebec and the Maritimes. No complete test of these assertions is attempted here. Space does not permit it and much research remains to be done before any really firm conclusion can be reached. In what follows only the main elements of the argument are sketched. Explanations based on cultural differences, however valid they may be, are all too frequently presented as almost self-evident. At the very least it would be reassuring to find indications that the heavy flow of migrants from Ontario, which otherwise appeared to be a relatively favoured area of the country, was not entirely at variance with a rational calculation of economic benefits.

In the first place, it should be kept in mind that the theory of resource allocation indicates only that workers will move from areas of lesser to areas of greater economic return. To postulate that when both Ontario and Quebec offer rewards inferior to those in the Prairie region or British Columbia, migrants would come from Ontario and Quebec in proportion to the relative gains to be achieved in each case, would require a much stronger formulation of the economic theory of migration than is made here. This is worth pointing out since it is too easy to be led to describe the world in linear terms.[30] Even with the stronger version, though, it is doubtful that the disparity in the movements from the eastern regions would be expected to be so great.[31]

An economic rationale for the especially heavy migration from Ontario to the west is found in the way in which the agricultural development of the Prairies affected agriculture in Central Canada. Proponents of the staple theory have emphasized the positive effects of agricultural development in

the west upon the non-agricultural, industrial economy of Central Canada. However, in 1901 and 1911 Ontario and Quebec still had significant proportions of their work force in agriculture. At an earlier date, Quebec agriculture had transferred from grain-growing to dairying, and hay and vegetable production. Immediately prior to the opening of the Canadian west, Ontario was the principal grain-growing region of the country and some districts of Ontario specialized largely in wheat production. The settlement of the wheat-growing lands of the west brought Ontario wheat farmers into direct competition with the new and highly productive farms of Manitoba and Saskatchewan. In the first decade of the century, a large segment of Ontario agriculture faced extreme competitive pressure and was forced to undergo a substantial transformation. The same kind of pressure on the agricultural sector was not found in Quebec; if anything, Quebec agriculture, like that of the eastern regions of Ontario that had already made the transformation out of wheat, enjoyed prosperous times.[32] The urban/industrial development of Quebec, nurtured by the investment boom in Western Canada, was accompanied by strengthened demand for the products of Quebec agriculture. The same was true in Ontario, in that a considerable part of the rural economy of that province found itself more directly in competition with farmers in the west.[33]

The rapid growth of cities and the industrialization of Central Canada meant that in both Ontario and Quebec there was an inducement for people to leave agriculture. The point being made here is that the inducement would have been relatively greater in the wheat-growing areas of Ontario. Potential migrants out of agricultural areas of Ontario and Quebec faced two alternative opportunities. They could move to the nearby cities or move to farms in Western Canada. The latter alternative would have been the more attractive to just those rural residents who were under greatest pressure to move – the people of the wheat-growing areas of western Ontario. These people were generally more distant from the growing urban centres and they already had skills in wheat-growing. It would be quite reasonable to expect that they constituted the main stream of Ontario migrants to the Prairie Provinces.[34]

An additional point to be made is that the flow of information from persons who had previously migrated would tend to favour persons from Ontario going to the Prairies. Previous migrants from Quebec and the Maritimes, for whatever reason, had gone predominantly to the United States. New England, their principal destination, was still growing rapidly in the early part of the twentieth century and represented a strongly competing alternative to migration to the Canadian west. It was closer so that the move would be less costly, and information about opportunities there would be better supplied. This would strengthen the inclination of migrants from

Quebec and the Maritimes to go to the United States while those from Ontario tended to move to the Prairies.

Ontario was losing population through migration to Western Canada at a substantial rate in the first decade of this century and continued to lose population to the west in 1911-21. At the same time, Ontario was a primary destination of immigrants and had positive net migration in both decades. Immigrants from other countries, in addition to a modest flow of migrants from other provinces, more than offset the outflow from Ontario to the west. The rapid development of manufacturing, finance and trade in Central Canada during this period meant that job opportunities were plentiful there as well as in the west. That large numbers of Ontario-born chose to migrate westward from the home province which was developing rapidly and enjoying a considerable measure of prosperity, leaving the rising demand for labour in Ontario cities to be met more by immigrant labour, is not necessarily irrational. To many Ontario farmers, the expected returns to a move within the agricultural sector, essentially from wheat farms in Ontario to wheat farms in Saskatchewan, may have looked better than the returns to migration to non-agricultural jobs in the cities. Furthermore, the existence of heavy immigration to Canada would have had the effect of depressing the relative price of labour both in the eastern cities and in the west, but it might have raised the expected profits in agriculture by providing hired farm labour at lower wages and a rising demand for farm land. In that context, the availability of free land to pursue a similar kind of farming to what they already practised might well have made a rationally calculating Ontario farmer choose to migrate to the Prairies rather than move to an Ontario city when he came to be faced with the competition of western wheat.

Within Central Canada, Ontario appears to have received the greater share of immigrants. Net migration to Quebec was positive but Quebec lost a much smaller number of people to other provinces than did Ontario.[35] Unfortunately there is no census record of immigrants during the decade 1901-11 but the intercensal change in foreign-born population in Quebec was less than half that of Ontario. The rising demand for labour in Quebec was drawing a larger proportion of workers from provincial natives than in Ontario. Smaller numbers of persons born in Quebec were migrating to other provinces and the ratio of native new entrants to the total male labour force was distinctly higher in Quebec than in Ontario. The attraction of Quebec for immigrants must therefore not have been as strong as that of Ontario.

It is likely that the demand for labour was rising more rapidly in Ontario than in Quebec, although this is difficult to prove since demand and supply forces cannot be separately identified. Non-agricultural employment expanded more rapidly in Ontario than in Quebec. This could, of course, be

merely the reflection of a greater increase in the supply of labour to Ontario. Certainly the rate of immigration was higher. However, there is no evidence of a fall in wages in Ontario relative to Quebec as one would expect if the shift of supply were the dominant factor. Indeed, the ratio of wages and salaries in manufacturing in Ontario to those in Quebec appears to have risen over the period (*Canada Year Book 1906*, p. 144). Although there has been insufficient research into the details of Canadian economic development in this period to substantiate the argument, the basis for expecting that the demand for labour may have been rising more rapidly in Ontario may be sketched out. The usual interpretation of the development of Central Canada in the period 1901-21 is along the lines of an induced reaction to the settlement of the west. The development of manufacturing in Quebec and Ontario is viewed largely as a result of the leverage effects of the boom in the west. The relationship is perhaps even clearer in functions like finance and wholesale trade. Western development raised demand for both consumer goods and capital goods that were manufactured in Central Canada. The farmers of the Prairies and the residents of Prairie trade and service centres purchased substantial amounts of consumer goods such as textiles, shoes, furniture and household equipment which were not manufactured locally and undoubtedly benefited the manufacturers of both Ontario and Quebec. But the western boom also gave rise to demands for capital goods. Railway construction was a large element in the boom. Ontario may have had a comparative advantage in the production of steel and machinery, products that were placed in especially high demand by the investment boom.[36] If this were indeed the case, the stimulus to the development of Ontario would have been greater than to that of Quebec.

In the first decade of the twentieth century out-migration from the Maritime Provinces was low in relation to what might be expected of this persistently lagging area in Canadian economic development. Levels of earnings there were well below those in the rest of Canada. Given the burgeoning prosperity of other parts of the country, a relatively high out-migration from the Maritimes might have been expected. The complex and rather puzzling case of this area is made a little clearer by looking at the rather different experiences of the individual provinces. Prince Edward Island, which had the lowest level of income but which carries little weight in the average for the three provinces, experienced a high rate of net out-migration. Indeed the ratio for males aged 20-44 (47 per cent of the mid-decade population of that group) was the highest negative ratio experienced by any Canadian province in all of the years considered in this study. For Nova Scotia and New Brunswick the ratios of net out-migration of the whole population were low in the first decade of the century and rose, but not markedly, in the succeeding decade. The low level of out-migration is not

so evident, however, in the migration of males aged 20-44. An examination of the detailed statistics of net migration by age hints at either a substantial amount of return migration to the Maritimes at older ages or a serious bias in the estimates. One way or another, the low ratios of out-migration from the Maritimes in the decade 1901-11 may have been partly a compositional matter. In addition, the economic situation of the region points to the reasonableness of an expectation of rather lower ratios of net out-migration in this decade than in many of the others under consideration.

The general historical literature suggests that the first decade of the century was a period of relative prosperity for the Maritimes, especially for Nova Scotia. Although levels of living may have been below other provinces, conditions may have been improving rapidly and prospects for the future may have looked fairly good. The late nineteenth century had been a period of relative retardation for the Maritime Provinces and the quickening pace of development at the beginning of the twentieth century might have encouraged people not to move. It was during this decade that the Cape Breton steel industry underwent its main development – almost a direct response to the railway investment in the other regions of Canada. In the second decade of the century, World War I raised the value of the ice-free ports of Halifax and Saint John. On the other hand, Prince Edward Island, which did not share in the new-found prosperity of the other Maritime Provinces and was feeling more keenly the competition of western agriculture, reacted, as would be expected, through large-scale out-migration.

The first two decades of the century were particularly interesting for the development of British Columbia. Growth was very rapid in the period 1901-11, then tapered off sharply in the succeeding decade. British Columbia, like Ontario, benefited by being able to supply capital goods required in the great investment boom of the period. In the earlier decade, the expansion of British Columbia and its great attraction to migrants stemmed mainly from the lumber industry. The burgeoning market for lumber in the Prairie Provinces allowed the British Columbia forest industry, which previously had been too isolated, to come into its own. As much as 70 per cent of the output of lumber of British Columbia went to the Prairies (cf. Mackintosh, 1939, p. 47). Other industries such as fishing and fish canning, base metal mining and smelting and agriculture were important and expanding but in the over-all picture were overshadowed by the forest industry.

The decade 1911-21 was a most intriguing one in the development of British Columbia. In this period the province, which in every other decade of the twentieth century showed spectacular growth relative to the remainder of the country, virtually stopped growing. Curiously enough, this sudden downward shift in the trend of growth of British Columbia has not received

the attention of either economists or historians.[37] In part this is a reflection of the paucity of economic history written about the details of Canadian development but more than that stems from the great scarcity of statistical data available for the early years of this century.[38] The estimates of regional levels of per capita income, which the author of this study has only recently made available, indicate a sharp fall in the relative level of British Columbia from 86 per cent above the national average in 1910 - 11 to only 21 per cent above in 1920 - 21 (Table 6.6). Part of this decline must be attributed to the achievement of a less abnormal age and sex structure of the provincial population and part is due to the convergence of prices in British Columbia toward those in regions to the east. However, the income statistics, along with the evidence of population growth, point to a striking retardation in the pace of development of the province.

The few studies that previously have looked at the historical pattern of inter-provincial migration in Canada have focused only on broad aggregates and have not contained much analysis. Net migration to British Columbia declined in the decade 1911 - 21 as it did for other Canadian provinces and the decline in the British Columbia rate does not appear to be sharply out of line. The net migration ratio was still over 20 per cent (Table 5.1). Here the aggregate is really misleading. The migration that it shows must have been predominantly wives and children of men who had previously moved to British Columbia. Net migration of males aged 20 - 44 fell almost to zero (Table 5.2).[39] This is consistent with the slow growth in employment. Table 5.9 shows that the expansion of work force in British Columbia between 1911 and 1921 was small and that of the non-agricultural work force almost non-existent. Space is lacking here to pursue at any depth the investigation of economic development in British Columbia in this decade but enough has been said to indicate that an interesting story remains to be told, awaiting only the research necessary to reach firm conclusions. For the present, suffice it to say that over the 1911 - 21 decade economic opportunities in British Columbia deteriorated markedly and that this was clearly recognized by potential migrants.

5.4.5 INTERRELATIONS IN THE PERIOD OF TRANSITION, 1921 - 31 — Although the decade of the 1920s is included here with the general period of expansion of the Canadian economy in relation to western settlement, in a great many ways it stands on its own. In this decade the pattern of economic opportunities shifted and along with it the pattern of migration. By 1921 the settlement of the Prairie region had been largely completed. The early 1920s were years in which doubts were raised about the long-term prospects of the region and in which some of the weaknesses of the wheat economy were revealed. The sharp depression which began in 1921 hit western agriculture with particular severity as wheat prices plummeted. The vulnerability of the

wheat economy to the vicissitudes of world prices and the over-extension of cultivation into unsuitable land became painfully evident and many farms were abandoned. The early years of the decade thus brought a pause to the development of the Prairie region and turned the attention of people to opportunities elsewhere.

Settlement was renewed during the latter half of the decade. The opening of the Peace River country again raised enthusiasm for the prospects of Prairie agriculture. World wheat prices were more favourable and reductions in the costs of farming were being achieved with satisfaction. The first indications of the potentialities of wide-scale mechanization and generally more prosperous times temporarily stemmed the tide of out-migration and for a few years brought new settlement. Prairie cities grew and acquired manufacturing industries such as flour milling, meat packing and oil refining. For the whole decade net migration turned slightly negative for Manitoba and Saskatchewan and, although positive, was still rather low for Alberta. The net migration ratio for males aged 20 - 44 remained positive for all three provinces and for Alberta was fairly high (15 per cent). Almost 250,000 immigrants came to the Prairies during the decade (Table 5.4) but the movement of native-born was apparently outward on net. The Prairie region was no longer the chief locus of economic opportunity and the main attractions to migrants lay predominantly in other regions.

In the terms of the staple interpretation of Canadian economic development, the decade of the 1920s witnessed a transition from wheat to base metals and forest products. The regions with resources of the new staples became the chief areas of attraction to migrants. Positive net migration was concentrated overwhelmingly in Ontario and British Columbia. By 1926 - 27 these two regions had achieved the highest levels of income per capita in the country. In the decade of the 1920s migration was closely correlated with levels of income. In addition, these were the regions where the ratio of domestic new entrants to the work force to the total male work force at the outset of the period was lowest. The rapid progress of British Columbia over this decade is also indicated by the large expansion of non-agricultural employment. The evidence strongly implies that the demand for labour in British Columbia was increasing sharply.[40]

Although Ontario was the second main destination for migrants during the 1920s, the rate of positive net migration was well below that of British Columbia – five per cent compared with 19 per cent (Table 5.1). The relative income position of Ontario was high and improving through the course of the decade but there are indications that the 1921 - 31 period was not so pre-eminently Ontario's decade as has often been supposed. The per cent growth of non-agricultural employment was much less than in either British Columbia

or Quebec – 26 per cent compared with 41 per cent in British Columbia and Quebec (Table 5.9). It is not denied that Ontario was a principal locus of economic opportunity in the 1920s but rather suggested that in comparison with other periods its relative position may have lagged behind that of British Columbia and Quebec. After failing to participate in the boom stimulated by western settlement to the same degree as Ontario, Quebec may have been coming into its own in the 1920s. The impetus to economic development in Canada had shifted to natural products which were abundant in the forest and mining frontier of Quebec. This kind of development may also have permitted better exploitation of Quebec's favourable endowment of hydro-electric sites. For a variety of reasons, then, the demand for labour may have been increasing relatively more rapidly in Quebec than in Ontario.

The low yet still positive net migration to Quebec in this decade might seem difficult to square with the argument of the preceding paragraph – that demand for labour was rising more rapidly in Quebec than in Ontario in the 1920s and that Quebec was, in a sense, a more favourable area of economic opportunity. Statistics of income somewhat confuse the issue; it is often thought that net in-migration to Quebec is at variance with the province's relatively low income position but this is not necessarily true. The relative level of income of Quebec may have been rising during the 1920s and to the east was a potential source of migrants in a region with an even lower level of income. Moreover, the income statistics, as well as the migration statistics, are highly aggregative. Aggregate income statistics may conceal a relative abundance of good opportunities available in Quebec. In this instance the growth of non-agricultural employment may be a more indicative measure. The principal thing that must be recognized is that demographic pressure in Quebec was high. The ratio of teen-age males to the male work force in Quebec had risen relative to other provinces after 1901 and by 1921 was substantially above that for any other province. Demand for labour may have been shifting strongly outward in Quebec in the 1920s but so was supply. Economic growth in the province was rapid but the stimulus to in-migration was held down by the abundant supplies of domestic labour. It is significant, however, that this is one of the few periods for which the province-of-birth statistics show a net exchange of population between Ontario and Quebec that was favourable to Quebec. This would seem to provide support for the contention that economic opportunities were relatively favourable in Quebec. A large-scale general migration to Quebec may have been discouraged by the rapid growth of Quebec population but many of the leading opportunities lay in the frontier areas of the forest and mining camps where migration from some region was necessary and there may have been a greater pool of skilled workers available in Ontario for these kinds of jobs. This is largely speculation but the evidence affords a consistent

picture. Especially in the light of later discontent with the economic performance of Quebec, this period warrants much more careful examination.

The rate of net out-migration from the Maritimes increased markedly in the decade of the 1920s. This is what the line of analysis pursued here would predict. The low level of per capita income of the region made it potentially an area of substantial out-migration and generally depressed conditions intensified the pressure to migrate. By their own historical standards the Maritimes had been experiencing relative prosperity in the years up to the end of World War I but this encouraging situation came to an abrupt halt as the Maritime economy found itself unable to adjust to the changed conditions of the postwar period. The fundamental locational disadvantages of the area were coming strongly to the fore. Of this period Mackintosh, 1939, p. 45, writes: "More than any region of Canada the Maritime Provinces were forced to readjust themselves, 1920 - 1929, to changed and unfavourable market conditions. Except for a modest share in the rising pulp and paper and electric power industries and in the tourist trade, the great boom of 1926 - 1929 had passed them by."

Nova Scotia was particularly hard hit. The ratio of net out-migration for males aged 20 - 44 rose to 27 per cent, the highest that province has experienced in the twentieth century. Almost no expansion took place in the non-agricultural work force and the total work force declined. New Brunswick also experienced its highest ratio of net out-migration of young adult males.

The situation differed for Prince Edward Island. The net migration ratio for males aged 20 - 44 fell to only half of the very high level of the previous two decades. The ratio of net out-migration of all persons over 10 years of age also fell, although it remained one of the highest in Canada. This is the only decade when the net out-migration ratio for Prince Edward Island was at a level lower than that for Nova Scotia. In contrast to the other two Maritime Provinces, Prince Edward Island may have experienced its worst period of crisis in the adjustment to changed conditions of economic life in the earlier decades of the century and, having achieved at least a partial adjustment, found the pressure for out-migration less compelling. One notable fact is that, owing largely to out-migration in the past, the ratio of young males to the total work force dropped markedly from 1911 to 1921 so that demographic pressure in the labour market in Prince Edward Island should have eased by the 1920s.

In general, the decade of the 1920s is an especially interesting but largely unstudied period in Canadian economic development. It was a period during which a fundamental change occurred in the location of economic opportunities and, as a consequence, a re-orientation of the pattern of migration was brought about. It was largely in this decade that the transition

occurred to what is by and large the present pattern of development in Canada.

5.4.6 INTERRELATIONS IN THE PERIOD OF DEPRESSION, 1931-41 – In the severely depressed decade of the 1930s the experience of migration was markedly different from any other period in the twentieth century. Nationally, net migration was negative for the only time during this century.[41] Of this period, the question that one has to ask with regard to migration is not, where did the best opportunities lie, but rather where were conditions relatively less bad than elsewhere.

The most interesting aspect of the decade of the 1930s is the difference in response to conditions in the two most severely depressed regions of the country. Negative net migration from the Maritimes fell almost to zero. The Prairie region experienced substantial out-migration. By probing into this difference some explanation may be found for an apparent breakdown of the economic interpretation of migration. None of the explanatory variables that have been considered in this study – per capita incomes, population pressure or the growth of non-agricultural employment – correlates significantly with migration in the 1930s. Part of the problem is that the fall in income in the Maritime Provinces, which already had the lowest levels of income in the country, was associated with a decline in the rate of migration.[42]

Ontario and British Columbia were relatively less hard hit by the depression and continued to experience positive net migration. Only for British Columbia, however, was the level very high (reflecting the flight of population from the Prairies). Just as in the United States the refugees from the dustbowls of Kansas and Oklahoma migrated to California, the movement in Canada out of the Prairie Provinces led westward to British Columbia, if not also to California.

The question of greatest interest in the analysis of migration in this decade is why, under severely depressed conditions, the residents of the Prairie Provinces chose to move out while those in the Maritimes were even less willing to migrate than in previous years. It is not possible to explore this problem fully within the confines of the present study but one possible interpretation may be sketched out as follows. In a period of severe depression, rates of migration generally fall. This has been widely documented. There are at least two reasons. As incomes fall the costs of migration come to have increasing relevance to decisions and financing migration by borrowing becomes especially difficult in depressed times. Secondly, the uncertainties of obtaining jobs in the regions of reputedly better (or at least less worse) conditions increase greatly. Therefore under severely depressed conditions people will attempt to get by where they are, if at all possible. It is

only when conditions improve generally that people will migrate in large numbers from disadvantaged regions.

Costs of migration and uncertainties about jobs bore rather differently upon the people in the Maritimes from those in the Prairies. The latter region was situated relatively favourably with respect to those areas where opportunities may have existed despite the generally hard times – British Columbia and the west coast of the United States. Distances to those areas were shorter and information flows more efficient. On the other hand, the traditional area of migration for Maritimers was New England, a region of the United States which was especially hard hit by the depression. For a person situated in the Maritimes the uncertainties of movement must have been even greater than for one in the Prairies. Secondly, the nature of depressed conditions differed between the two regions. Both were experiencing a depression which laid bare certain fundamental weaknesses in the regional economies. In comparison with other regions of Canada, both were more heavily dependent upon the production of primary commodities for export. But the Prairies suffered the additional affliction of drought. The story of this aspect of the depression in the Prairie Provinces has been frequently told (cf. Britnel, 1939). It has an important bearing on the explanation of migration patterns, however. Whereas the resident of the Maritimes could maintain a subsistence even under greatly reduced prices, a considerable number of persons in the Prairie Provinces were literally forced out by drought conditions. The need to migrate was much more immediate. The costs of holding on until better times simply could not be borne. It may have helped that many of the residents of the Prairie region had been previous migrants so that moving was less disruptive to them but the sheer fact was that many of them had to move and to move immediately to maintain a bare livelihood. One important consequence of this is that the adjustment to changed conditions in the Prairie Provinces occurred much more rapidly than it ever has in the Maritimes.

5.4.7 INTERRELATIONS IN THE PERIOD OF RECOVERY, 1941-51 – The distressed condition of the Prairie and the Maritime regions during the 1930s, discussed in the preceding Section, emphasized an essential fact of the economy of both regions. Populations exceeded the economic base available to support them at anything like the national average level of income. Demand for the primary products of these regions was decidedly unfavourable and, in addition, both the wheat-farming areas of the west and the fishing and farming areas of the Maritimes entered into a period of rapid mechanization. This combination of mechanization with slowly growing or even decreasing demand for the primary products of the regions brought a growth of demand for labour far less than the natural growth in supply. Adjustment began in

the Prairies in the decade of the 1930s but in the following decade net out-migration proceeded at a high rate from both regions.

In this decade of adjustment, the principal destinations in Canada for migrants were Ontario and British Columbia. These were the regions in which the most favourable opportunities lay. Quebec appears distinctly to have lagged and to have experienced a net loss through migration despite immigration from abroad. Net migration over the decade was highly correlated with relative levels of income at the beginning of the period. The substantial shift to an urban, industrial economy that occurred during this decade is evident in the extent of growth of employment in non-agricultural occupations. 'Industrialization' was most rapid in British Columbia and Alberta but the relative growth of non-agricultural employment was also high in Ontario and Prince Edward Island. Of the Prairie Provinces, Alberta had by far the lowest rate of out-migration.

Among the Prairie Provinces, the adjustment of population was greatest in Saskatchewan, the province most dependent upon wheat and with the smallest urban sector. It required a more marked adjustment to the new conditions of the postwar era than Alberta or Manitoba. Saskatchewan had experienced relatively high rates of natural increase in the latter parts of the settlement era and by 1931 had a ratio of males aged 10 - 19 to the total male work force that was well above that of its neighbouring provinces. Potential pressure on the supply of labour did not fall noticeably during the decade of the 1930s so that the extent of population adjustment required of Saskatchewan in the 1940s was even greater than what was imposed by the altered conditions of demand.

Demographic pressure was also evident in Quebec and, to an increased extent, in New Brunswick which by 1941 had surpassed Quebec in the ratio of teen-aged males to work force. Quebec underwent net out-migration, although not on a large scale. The indications are that, in this period of relatively rapid national expansion, Quebec tended to lag. The growth of non-agricultural employment was lower than in Ontario. Demographic pressure in Quebec was still relatively high but there were significant factors underlying its relatively slower progress than other regions of the country. To pursue the matter further in this study would lead too far from the main thread of discussion.

In the events of the decade of the 1940s, what stands out most is the extent of the movement of population out of the Prairie region. The reaction to the changed prospects of that region was both quick and massive by historical standards. Over a period of two decades. Saskatchewan was losing population through migration at a rate of more than 20 per cent per decade. In the 1940s the net out-migration of males aged 20 - 44 was 32 per cent of

the average number in that age cohort over the decade. History has frequently witnessed massive migration into regions of new settlement. Seldom has it seen such massive out-migration in the face of changed conditions.

5.4.8 INTERRELATIONS IN THE PERIOD OF CONTINUING NATIONAL GROWTH, 1951-61 – In the 1951-61 decade, the pattern of migration and of economic opportunities was largely the same as that established in the 1920s. The chief areas of economic opportunity were Ontario and British Columbia, the position of Ontario being perhaps relatively stronger than ever before. Quebec showed signs of catching up after the lagging decade of the 1940s. The population adjustment in the Prairie region was largely complete and the Maritimes remained as the main region of large-scale net out-migration. The decade was also one of heavy immigration which makes for some divergences between net migration and domestic internal migration.[43] The provinces that gained most through migration were those with the highest levels of per capita income; provinces with negative or very low positive net migration tended to have lower average incomes.

Conditions of supply in regional labour markets help to account for some aspects of the pattern of migration that fit in less easily to the correlation with levels of income. Although it remained primarily an agricultural area still dependent upon wheat production, Saskatchewan appears to have made its adjustment of population to the scale of economic opportunities by the 1950s. The level of income remained highly variable, depending upon supply conditions in agriculture but, with the help of somewhat better than average crops, it rose by 1950-52 to above the national average and has since tended to rise relatively further. During the decade 1951-61, net migration continued to be negative. There are two reasons for this. The first is that the ratio of males aged 10-19 to the total male work force was relatively high in Saskatchewan in 1951.[44] Secondly, the main centres of growth of non-agricultural employment in the Prairie region lay outside of Saskatchewan – mainly in Alberta. Thus to a considerable extent the continuing out-migration from Saskatchewan, in a period when net out-migration had ceased from the other two Prairie Provinces, was not inter-regional migration of the sort that net migration of the other large provinces represented, but migration within an economic region from the rural to the urban areas.

Net out-migration from the Maritime Provinces was high during the decade 1951-61. This is again in line with expectations, although the ratio for Nova Scotia was relatively lower than for the other two provinces – something that is not so easy to explain.[45] Part of the explanation of the difference among the individual Maritime Provinces in ratios of out-migration lies in differing degrees of demographic pressure. The ratio of males aged 10-19 to the total male work force in New Brunswick in 1951 was 36 per

cent above the national average. Outside of Newfoundland, no province in Canada had such a strong indication of demographic pressure at any census date during the twentieth century.[46] Demographic pressure in Prince Edward Island was evidently much less severe and more in line with that of Nova Scotia. The very high rates of net out-migration from Prince Edward Island were rather like those of Saskatchewan, reflecting the lack of local urban and industrial opportunities.[47]

One of the more interesting features of internal migration in Canada in the postwar period was the shift of migrants from the Maritimes away from destinations in the United States toward other parts of Canada, especially Ontario. In the 1920s, a decade of especially high out-migration from the Maritime Provinces, only a small fraction of migrants from that area moved to Ontario; by far the greater part migrated to New England and other parts of the United States. For Nova Scotia, for example, in the decade 1951-61 net migration was 27,000. The intercensal change in Nova Scotia-born residing in other provinces was 35,000. The difference between these two numbers was at least partly attributable to deaths during the decade of previous out-migrants from Nova Scotia to other parts of Canada. The implication, though, is that by the 1950s migrants from Nova Scotia were destined primarily for other parts of Canada. The contrast with earlier periods is sharp. In the decade 1921-31, for example, net migration from Nova Scotia was 67,000. Province-of-birth data suggest a net flow to the other provinces of Canada of no more than 10,000, the remainder going to the United States.

Several reasons may be advanced for this change in the distribution of migrants from the Maritime Provinces. As important as any may be improved communications, that gave prospective migrants from the Maritimes better information about opportunities in the other parts of Canada than they had in earlier years. In addition, the interlude of low migration in the 1930s would have produced a break in ties with traditional areas of destination in the United States and left fewer Maritime-born in those areas to channel information to friends and relatives at home. Also important has been the change in relative attractiveness to Maritime migrants of New England and Ontario. In recent decades, New England has been a lagging region of the United States and has itself had persistent net out-migration. On the other hand, Ontario has been one of the most prosperous and most economically progressive regions of Canada and so would appear to be more prospectively rewarding to potential migrants than in the past. Long distances that mean higher costs of migration and, probably more importantly, less information about opportunities have always tended to hold down migration from the Maritimes to the western provinces. This is still the case but is less signif-

icant than before. In the period of western settlement, with closer and better-known opportunities in New England available, the attractions of the Canadian west were a pleasant but distant and unappealing opportunity. The eastward shift that has occurred in the locus of economic opportunity, particularly in the period since the Great Depression, in combination with the reduced attractiveness of the New England states, has served to direct more of the migrants from the Maritime Provinces toward Central Canada.

A second feature of the pattern of migration in the decade 1951-61 that calls for special attention was the emergence of Alberta as a leading area of attraction to migrants. It has already been claimed that, by this most recent decade, the Prairie Provinces as a whole had largely accomplished the adjustment of population made necessary by depression and drought superimposed upon a longer-term trend of farm mechanization. By the 1950s, the population of the region had been brought into line with the reduced labour requirements of the wheat economy. For the region as a whole, net out-migration had turned positive. The ratio of net migration to Alberta rose to a level close to that of British Columbia and Ontario. Clearly Alberta had emerged as a leading area of economic opportunity. The level of income of Alberta in 1950-52, although below that of British Columbia and Ontario, was well above that of any other province. In the decade 1951-61, relative levels of per capita income were still the best indicators of expected rates of net migration. Job opportunities in Alberta were plentiful and expanding at a rapid pace. The expansion of employment, especially employment in non-agricultural occupations, was remarkably high (62 per cent). There can be no doubt that the high rate of net migration of population to Alberta was a rational economic response to rewarding opportunities.

The basis of the remarkable progress of Alberta in recent years is not yet fully understood. In the popular view the critical factor has been the discovery of oil. This view is also accepted by many analysts. Easterbrook and Aitken, 1956, p. 496, for example, conclude: ". . . but quite as important in prairie population change and not unrelated to the rate of mechanization in western agriculture has been the impact of western oil discoveries. These have brought about striking changes not only in Alberta but throughout the prairie economy. Refinery expansion, pipe-line construction and an intensive search for oil throughout western Canada have led to a radical change in the the economic outlook of the whole region."

However, it is difficult to demonstrate the critical importance of the oil discoveries, especially for employment and population. In a more careful analysis, Caves and Holton argue that the consequences of oil discoveries for employment in Alberta have been minor and that one must look elsewhere to find the principal basis for rapid development; they conclude "The 'oil

era', if we can call it that, seems likely to have relatively little effect on the population of the province'' (1959, p. 214). Thus the basis for expanding economic opportunities in Alberta is unclear. The main factor may be merely an indigenous development of service industries on the existing economic base of the Prairie region. For whatever reason, the attraction to migrants exists, and the migration is largely a movement from inferior to superior economic opportunities. The Canadian-born migrants to Alberta came predominantly from nearby provinces, particularly Saskatchewan. The migrants from Saskatchewan were principally young men and women at the age of their first entry to the labour market. Part of the answer may be found in the conditions affecting the supply of labour. The ratio of prospective labour force entrants to the existing labour force was significantly higher in Saskatchewan in 1951 (29 per cent) than in Alberta (26 per cent). Even if employment opportunities were expanding as rapidly in Saskatchewan as in Alberta there would have been an inducement for migration. The fact seems to be that employment opportunities were expanding even more rapidly in Alberta. The argument involving the supply of labour does not explain why Alberta gained many migrants from British Columbia (although not as many as Alberta lost to British Columbia). The conclusion is that demand conditions must have been strong but the reasons cannot be fully explained.

5.4.9 **CONCLUSION** – The foregoing discussion of migration among the provinces of Canada during the six decades of the twentieth century has drawn together a variety of evidence to support the view that migration in Canada can appropriately be characterized as an economically motivated search by people for superior opportunities to those available in the region in which they reside. The author's over-all judgement is that the economic theory of resource allocation provides a good account of the pattern of migration that has been experienced. It should be emphasized again that this is not to deny that there might be other important motives to migration but, especially in the aggregate, movements of population have been largely as would have been predicted on the basis of a continuing adjustment of population to a changing distribution of economic opportunities. The applicability of the economic model is not uniform but it was particularly encouraging to be able to show that it had relevance even to situations where it is commonly believed that strong non-economic factors have been operating.

The account given is still far from a complete analysis. The economic model has been used more in an indicative way and has not been subjected to rigorous testing, nor has it been fully exploited. This study must be regarded as a preliminary endeavour. At several points indications have been given of how the analysis could be extended. Hopefully these suggestions will be followed up in the near future. The main intention of the present study was to examine in a fairly general way the applicability of an

economic model of migration to internal movements among regions of Canada. Viewed in that light the analysis comes off passably well. For the most part, migration can be accounted for as an adjustment to regional differences in per capita incomes. Where income differentials are less significant or appear to account for migration to only a slight extent, other economic variables such as the growth of non-agricultural employment or prospective supply pressures in the labour market frequently supplement the explanation ably.

The question that one is prompted to raise is how effective migration among provinces has been in achieving an adjustment of population to changing economic opportunities. Public discussion tends to swing between the view that there is not enough migration to even out regional differences in incomes and the view that there may have been too much migration. The general conclusions of economists looking at migration have tended to support the former view – that labour is not sufficiently mobile to effectively erase differences in regional incomes. For Canada there is quite a bit of evidence that, over a relatively long period of time, per capita income differentials have not diminished despite substantial migration (cf. McInnis, 1968; Chernick, 1966). The analysis of this study has not been aimed specifically at answering the question. It is one thing to show that migration has been economically motivated and has tended to redistribute population from regions of low to regions of high income. It is another thing to demonstrate that the redistribution has been of sufficient volume effectively to reduce income differentials.[48] Although the analysis has not provided proof of the sort that one would like to have, the direction in which the conclusions point is optimistic. Over most of the period covered by this study the tendency in population redistribution through migration has been away from lower income regions and toward regions with higher incomes. But at this stage the possibility cannot be excluded that this aggregate evidence may conceal compositional differences that would have tended to work in the direction of widening income differentials. In the main, however, migration in Canada appears to have been in the direction of diminishing regional variations in economic opportunity.

There remains the question of whether the flows of migration have been great enough to have accomplished the task of income equalization. In one sense the answer must be no, since the evidence is that income differentials among the provinces have not been reduced.[49] However, a great many influences come to bear on the determination of regional income levels and the question that should be asked is whether, in the absence of divergent forces, migration would have been effective in reducing income differentials. A more refined model is needed before any firm conclusion can be reached.

It is not at all clear, though, that the Canadian population has been inadequately mobile. Indeed, the history of migration in Canada suggests a very considerable willingness of the population to adjust to altered economic circumstances through migration. Especially among the important group of males aged 20 - 44, net migration frequently has been in excess of 20 per cent of the mid-decade population. It is difficult to conceive of a much more responsive population. It has been shown in this study that, where migration out of low income areas has been weak, the evidence that migration would have been a rational economic decision is also weak.

The real difficulty is not that the population is insufficiently willing to migrate but that the pace of change of economic conditions is so rapid. The dynamic forces of economic progress are themselves continuously working to change the spatial distribution of economic opportunities and to create the need for further adjustment and redistribution of population. Too much should not be expected of migration. The present study affirms that, at the very least, the Canadian experience of regional migration in the twentieth century will not support a broad claim of lack of mobility or inability of the population to adjust to the changing distribution of economic opportunities.

5.5 THE PATTERN OF INTER-PROVINCIAL FIVE-YEAR MIGRATION, 1956-61

This part of the study attempts to bring a more refined analytical technique to bear on the pattern of inter-provincial migration in Canada. The availability of statistics of net migration for only nine or ten provinces, as was the basis of the analysis in the preceding part of this Chapter, has heretofore been a formidable barrier to the application of statistical techniques such as regression analysis in Canadian migration studies. Attempts to increase the number of observations through analysis at sub-provincial levels are severely hampered by the unavailability of quantitative measures of the economic factors that might be used as explanatory variables. The statistics of migration collected in the sample enumeration of the 1961 Census thus provide an opportunity to pursue the economic analysis of inter-provincial migration patterns with somewhat more sophisticated techniques.[50] Such analysis is still rather constrained by inadequate data so care must be taken not to over-emphasize the gains to be made through the use of the 1961 Census statistics. They are a valuable new resource, however, and the following pages represent a first endeavour to exploit this resource in exploring the economic determinants of internal migration in Canada.

5.5.1 AN OVERVIEW OF THE PATTERN OF INTERNAL MIGRATION – A brief overview of the pattern of migration among Canadian provinces in the quinquennium 1956 - 61 provides a useful setting for the subsequent analysis. This pattern can be seen both in the 1961 Census statistics of migration and in net migration estimates made by the survival ratio method. The latter set of statistics displays a pattern very similar to that for the whole decade 1951 - 61, described in Section 5.3.5. The far western provinces (Alberta and British Columbia) and Ontario were the main areas to gain through migration. The highest rates of loss were experienced by Saskatchewan and Nova Scotia but the Atlantic Provinces generally experienced net out-migration. Quebec and Manitoba had net gains. Mobility was evidently lower in the second half than in the first half of the decade and levels of migration fell below what would be expected on the basis of the rates for the entire decade. In general, the second half of the decade of the 1950s was a period of slower growth and persistently high unemployment rates. There is ample evidence that for Canada, as for other countries, levels of migration tend to be positively related to the pace of development and the extent of prosperity (cf. Vanderkamp, 1968).

The pattern of inter-provincial migration revealed by the 1961 Population Sample statistics is broadly similar to that shown by the survival ratio estimates but differs in some important respects. The two series are presented for comparison in Table 5.11. Focus is here on the extent of conformity of the patterns of migration by provinces that are revealed by these series. Both the net migration of the whole population and that of males aged 20 - 44 are shown.

5.5.2 INTERNATIONAL MIGRATION AND INTERNAL MIGRATION – The principal differences between the two series (Table 5.11) result from the restriction in coverage of the estimates from the population sample to internal migration only, and from the large role of international movements in over-all provincial net migration, although the additional restriction of the census sample to private households is also likely to have had a bearing on the differences. In 1956 - 61, as in the earlier periods studied in this report, international migration was a dominant element in provincial net migration. Owing largely to immigration, net migration to British Columbia and Ontario was much larger than the net interchange with all other provinces. Quebec had positive net migration but a net loss in exchange with other provinces, and the same was true of Manitoba. A comparison of the two series indicates some significant differences between the patterns of inter-provincial migration and the provincial distribution of immigration and emigration, which are of no small consequence for the following analysis. In that analysis attention is directed to inter-provincial interchanges of popu-

Table 5.11 – Net Migration and Net Internal Migration Ratios, by Province, 1956-61

Province	Net migration ratio[a]	Net internal migration ratio[b]
	Population aged five and over, 1961	
Newfoundland	– 3.5	– 1.1
Prince Edward Island	– 3.0	– 1.1
Nova Scotia	– 2.4	– 2.1
New Brunswick	– 2.4	– 0.9
Quebec	2.4	– 0.2
Ontario	5.6	0.6
Manitoba	0.1	– 1.8
Saskatchewan	– 3.6	– 3.6
Alberta	5.6	1.3
British Columbia	7.5	2.2
	Males aged 20-44, 1961	
Newfoundland	– 8.1	– 2.4
Prince Edward Island	– 5.5	– 1.7
Nova Scotia	– 6.2	– 4.1
New Brunswick	– 5.2	– 1.6
Quebec	3.3	– 0.1
Ontario	– 9.3	0.8
Manitoba	1.3	– 2.6
Saskatchewan	– 5.2	– 5.0
Alberta	10.1	3.0
British Columbia	9.8	2.1

[a] Survival ratio estimates. See Table 5.1, footnote [a].

[b] Five-year migration. See Table 2.1, footnote [c]. In this case the base of the ratio is the 1961 population.

SOURCES: 1961 Census, DBS 98-510, Table I.1; and Stone, 1967[a], Table L.4.

lation and it cannot be assumed that these are uninfluenced by external migration patterns. To some extent at least, external migration must be viewed as competing with internal movements. However, not enough is known about the composition of migration movements to speculate on the consequences of this in anything like a conclusive way. If inter-provincial migration streams differ substantially from one another in composition, it might be that international migration has the effect more of reducing the general level of internal mobility than of biasing its direction. The possible role of international migration should not be forgotten in considering the following analytical results. In the regression analysis, however, attention is directed

solely to inter-provincial migration. This emphasis may not be entirely misplaced since, apart from the levels of migration and the magnitudes of provincial differentials, the broad pattern of migration exhibited by the two series is roughly the same (the coefficient of rank correlation between provincial net migration per thousand population and rates of net internal migration is .79).

5.5.3 MIGRATION PATTERNS AND INCOME DIFFERENTIALS – A broad look at net migration by provinces indicates that, along the lines of the analysis of earlier periods undertaken in Section 5.4, the movements can be characterized largely as adjustments of population to differential economic opportunity. Provincial net migration ratios are quite highly correlated with levels of income. The coefficient of rank correlation between net provincial migration and average per capita personal income in 1955-57 is .79. In this regard the difference between internal migration and over-all net migration is significant in that the former is distinctly less highly correlated (rank correlation coefficient of .52) with income differentials than the latter. A substantial part of the flow of migration from the low income areas of the Atlantic Provinces is still directed toward the United States. And Manitoba, which is losing population in exchange with other provinces, remains an attractive destination for immigrants.

5.6 REGRESSION ANALYSIS OF INTER-PROVINCIAL MIGRATION IN CANADA, 1956-61

5.6.1 THE REGRESSION APPROACH – The regression approach is only one of several alternatives that might be followed in analysing inter-provincial migration. It has been adopted here because it is likely to be familiar to most readers and because it provides a means to test the predictions of a strictly specified model of migration. It contrasts, in this respect, with the more broadly interpretive analysis of Section 5.4. The regression approach is constrained in that it can handle only a few pre-specified influences in an admittedly complex situation and it handles these influences in an inflexible way, but precisely for that reason it may permit more objective and definite judgement of the roles of those influences.

There are now quite a few studies of internal migration in the United States that utilize the regression approach. To the author's knowledge, no published study of inter-provincial migration in Canada has been based on this technique. A major obstacle to the use of regression analysis for the study of internal migration in Canada is the severe data demands of the approach. Net migration statistics for only nine or ten provinces provide too few observations for justifiable application of the regression technique. The

1961 Population Sample provides data on migration that may permit the surmounting of the usual difficulties facing the analyst of Canadian internal migration. Migration matrices can be constructed from these statistics that have as their elements the movement between each pair of provinces. Such data are available not only for all migrants but for particular sub-groups of the population, an important consideration in the design of this study. For example, by focusing on males of a particular age group, the test of the economic model of migration can be made more discriminating. There remains a question of the independence of the observations where the measure of migration applies to flows between each pair of provinces. The sample these data provide, however, may be adequate for a justifiable application of regression analysis and the study proceeds on that basis.

5.6.2 MIGRATION AND THE ECONOMIC THEORY OF RESOURCE ALLOCATION – The economic theory of resource allocation, as it applies to labour migration, was outlined in Section 5.1. In this part of the study a particular formulation of the theory will be applied, with the use of regression analysis, to the evidence of internal migration supplied by the 1961 Population Sample statistics. In order to make such an application, the theoretical model must be specified in a conceptually satisfactory but empirically usable way.

Following the outline of the theoretical model presented in Section 5.1, the view of migration adopted here predicts migration to occur when individuals find that, through geographical movement, they are likely to increase their earnings by an amount sufficient to make them willing to incur the costs of moving.[51] The most important qualification to be made is that decisions to migrate are taken under conditions of uncertainty. Knowledge of opportunities for gain in distant regions is far from perfect and the lack of such knowledge must constitute a barrier to movement. The foregoing kind of relationship applying to individual workers is assumed also to apply to workers in the aggregate. Serious problems may arise, however, out of the aggregation of classes of labour for which the spatial distribution of economic opportunities may be substantially different. It would therefore be valuable to be able to study separately the migration patterns of highly specific groups. Unfortunately, that is not possible with the kind of evidence that is available at present. Part of the contribution of this study lies in its attention to groups less comprehensive than the whole population but the movement made in the direction of disaggregation remains small.

5.6.3 SPECIFICATION OF THE REGRESSION MODEL – The specification of a regression model for this analysis raises a number of issues that are reviewed in some detail in Appendix I. The choice of dependent and independent variables and the form of the relationship to be estimated are justi-

fied there. The model is one of several that might be taken to represent the general theoretical relationship already outlined. The dependent variable is the net interchange of five-year migrants among pairs of provinces. If M_{ij} represents the flow of migrants between province i and province j, the net interchange, N_{ij}, is the difference between M_{ij} and M_{ji}. The absolute values of N_{ij} are then related to variables representing the principal economic determinants of migration-gains in earnings and costs of movement. The N_{ij} are all taken to be positive and the sign of the relationship is given by the explanatory variables. Attention is directed principally to N_{ij}, the absolute value, without sign, of the net interchange of population between each pair of provinces between 1956 and 1961. An alternative dependent variable that is more in line with demographic tradition in the analysis of migration, the ratio of the net interchange to the sum of the populations of the sending and receiving areas (M_{ij}), is also considered. Because the numbers of migrants to individual provinces is typically small, the Atlantic Provinces are grouped into a single region. Thus, there are 21 observations – only barely above a reasonable minimum for regression analysis. As noted above, the dependent variables N_{ij} are considered for several sub-groups of the population and a subscript to N is used to identify the particular sub-group. Thus N_2 represents the net interchange of all males five years of age and over.

The economic theory of migration suggests explanatory variables that represent economic gains and costs of migration. An attempt is made also to introduce the role of information. Two different income variables are used, alternatively, to represent economic gains. Distance is used as a crude proxy for costs of migration and also to represent the decreasing flow of information over space.

The most complete model that is analysed considers the following explanatory variables:

P ... is the sum of the populations of i and j of the relevant sub-group of the population.

Y ... is the average difference between pairs of regions in Personal Income per worker over the years 1955 to 1960.

W^*... is the difference between pairs of regions in adjusted wage and salary earnings in the 12-month period preceding June 1961, as reported in the 1961 Census; the adjustment takes into account provincial variation in occupational composition so that it reflects the earnings differentials that would exist if all provinces had the national occupational composition and the actual earnings of specific occupations *within* each province. (Appendix Table I.1)

W^* and Y are used alternatively. Issues concerning the use of either are considered more fully in Appendix I.

D ... is the highway mileage between the principal urban centres of the i^{th} and j^{th} regions. D is introduced in part to represent costs of movement

but also reflects the role of information on opportunities in other regions which decreases with distance.

B ... is the number of persons born in the net losing region but residing in the net gaining region in 1956.

U ... is the average rate of unemployment in the net gaining region over the 1956-60 period.

*U**... is the average ratio over 1956-60 in the net losing region of persons receiving unemployment insurance benefits for 20 weeks or more to the total number of workers with unemployment insurance; it is intended to represent hard-core or long-term unemployed — a measure of economic distress.

E ... represents expectations and is measured by the ratio in the net gaining region to the net losing region of per cent growth of per capita income, 1953-58.

5.7 RESULTS OF THE REGRESSION ANALYSIS.

5.7.1 ORGANIZATION OF RESULTS — The following Sections present the results of the regression analysis. An elaborate model based on all of the explanatory variables described above is first considered. On the basis of the results obtained with this elaborate model, a simpler specification is selected and used to explore the rate of various influences on migration. A variety of aspects is examined for a regression of male inter-provincial migrants of all ages (N_2) on selections of explanatory variables. Attention is then directed to the role of age and educational attainment and the extent to which they modify the influence of the economic determinants of migration.

5.7.2 RESULTS WITH THE COMPLETE MODEL — The principal features of the outcome and many of the problems raised by the regression approach can be seen in the results obtained with the most elaborate model that was estimated. This model hypothesizes that the net interchange of all males (N_2) should be positively related to P_2 and Y and negatively related to D. The variable B is also introduced to represent the flow of information about economic opportunities and should be positively related to migration. Three other economic variables, U, U^* and E are introduced to capture influences that might not work directly through current income differentials and costs of movement. The coefficient of U^* and E should be positive and of U negative.

$$N_2 = 146 - .41P_2 + 1.71Y - 86D + 41.1B + 81.1U + 631.6U^* - 56.7E + u$$
$$\quad (1.35) \quad (.78) \quad (1.52) \quad (2.95) \quad (.34) \quad (1.50) \quad (.05)$$
$$R^2 = .80 \qquad [1]$$

The numbers in parentheses are values of t and may be used to gauge the significance of the coefficients to which they refer. The coefficient of determination, R^2, unadjusted for degrees of freedom is presented as an

indicator of goodness of fit. A major difficulty of interpreting the results of equation [*1*] and of other results in this study stems from the fact that the observations of N_2 are not truly independent. Thus we cannot be sure how many degrees of freedom we really have. Taken at face value R^2 indicates that about four fifths of the variation of N_2 among provinces is accounted for by the regression equation. Keeping in mind the uncertainty about how many degrees of freedom to assume, it might be taken as a rough rule of thumb that R^2 above *.50* would suggest that, in the situation under consideration, the explanatory variables are reducing the unexplained variation of migration by enough to warrant giving further consideration to the regression results. The primary objective is to explore the determinants of migration, not to maximize R^2 but some assurance is required that the model is accounting for a satisfactory amount of the variation of migration. A conservative approach to the evaluation of significance of the regression coefficients that is obtained might guess that in reality there are no more than seven degrees of freedom, in which case t must exceed *1.90* to conclude at a *.95* level of confidence that the estimated value of the coefficient exceeds zero.

Equation [*1*] produces a mixture of results. The coefficients of Y (inter-provincial income differentials) and D (distance) have the predicted signs but are not significant. The information variable, B, has the expected sign and is the only coefficient with a significant t value. U^* looks promising, although its coefficient falls short of significance. The signs of U and E are opposite to what the theory predicts but the coefficient of neither variable is significantly different from zero.

The weak relationship between the net interchange (N_2) and the population base (P_2) is at first glance rather surprising. In the Canadian case at least, there is no significant correlation between net migration and size of population. The zero-order correlation between the two is only *.09* (Table 5.12). This finding strengthens the decision to use the absolute level of net migration as a dependent variable rather than the ratio of net migration to population. If population size had an important influence it would be captured by the introduction of the base population as an independent variable.[52]

A more general conclusion should not be drawn but it is quite clear that among Canadian provinces net migration is uncorrelated with provincial population size. This is because the western provinces, with rather small populations, have high net migration values. This may be a reflection of genuinely higher propensities to migrate among people residing in Western Canada. Rates of gross migration tend to be higher in the west. The larger is gross migration, the higher is the probability of large random results for

net migration. Reflecting on the well-substantiated evidence that net migration is typically only a small fraction of the gross movement, one is tempted to ask whether there really should be any expectation that net migration would be correlated with the population base. Migration ratios may be useful in showing the relative importance of migration for population growth but for the purpose of the present analysis the absolute level of net migration, not the ratio to population, is the relevant measure. In much of the subsequent analysis, therefore, the population base is generally left out of the regression equations. In those cases where it might make a difference, both specifications are used.

Table 5.12 – Zero-Order Product-Moment Correlation Coefficients Between Selected Variables and the Net Interchange of Five-Year Migrants Between 21 Pairs of Major Regions, Canada, 1956-61

Variable symbols[a]	N_2	P_2	Y	D	B
N_2	–	0.09	0.41	- 0.62	0.81
P_2	0.09	–	0.13	- 0.03	0.37
Y	0.41	0.13	–	0.11	0.45
D	- 0.62	- 0.03	0.11	–	- 0.57
B	0.81	0.37	0.45	- 0.57	–
U	- 0.35	- 0.15	- 0.63	0.22	0.02
U^*	0.19	0.10	0.52	0.21	- 0.44
E	0.28	- 0.04	0.26	- 0.24	- 0.19
W^*	0.43	0.13	0.93	- 0.01	0.44

Variable symbols[a]	U	U^*	E	W^*
N_2	- 0.35	0.19	0.28	0.43
P_2	- 0.15	- 0.10	- 0.04	0.13
Y	- 0.63	0.52	0.26	0.93
D	0.22	0.21	- 0.24	- 0.01
B	0.02	- 0.44	- 0.19	0.44
U	–	- 0.07	- 0.38	- 0.51
U^*	- 0.07	–	0.38	0.66
E	- 0.38	0.38	–	0.35
W^*	- 0.51	0.66	0.35	–

[a] See text for definitions of variables.

SOURCE: Appendix I, Table I.2.

The analysis of the following Sections involves a simple model that includes only earnings differentials and distance as explanatory variables. The expectations variable and the two unemployment variables, U and U^*, are generally not emphasized. With only 21 observations there is a clear need to conserve on degrees of freedom. The simple model left appears, however, to be capable of producing some useful results.

5.7.3 RESULTS WITH A SIMPLER MODEL – The leading difficulty with the model as presented in 5.7.2 involves the "relative and friends" variable B, adopted as a proxy for the flow of information about economic opportunities. That variable dominates both equation [*1*] and the simpler relationship presented as equation [*2*]. It is the only explanatory variable with a statistically significant coefficient and is largely responsible for the high R^2.

$$N_2 = 1326 + .63Y - .69D + 39.80B + u \qquad [2]$$
$$(.96) \quad (1.67) \quad (3.33)$$
$$R^2 = .76$$

Two very different interpretations may be given to the strength of the influence of B. One is that it is performing as expected and that flows of information are indeed the dominant influence on migration. This is the interpretation accepted by Phillip Nelson, 1959 whose results, at least with regard to the relative roles of B and of distance and differential economic opportunity, are remarkably similar to those presented here. Nelson emphasizes the scarcity of information, a factor that leads to a pattern of migration which conforms most closely to the pattern of information flows, although still generally in the direction of improved earnings. The prospective migrant, so runs this argument, moves to take advantage of an opportunity that he knows about rather than to his best alternative earnings. The extent to which migration serves to redistribute population from low income to high income areas then depends crucially upon the efficiency of the flow of information about economic opportunities. The greater and more efficient the flow of information, the closer the pattern of migration will conform to that predicted by the purely economic model of the maximization of net benefits. If information were abundant, rational decisions to migrate to the best alternative locations could be readily carried out. With information curtailed, the best alternative locations are seldom known and migrations tend to be just to some known alternative location where higher earnings are possible. In that case the flow of information rather than differential earnings becomes the leading determinant of migration.[53]

As a theoretical argument the foregoing has considerable appeal. A different interpretation is at hand, however, that attributes the strong in-

fluence of B to multicollinearity between B and Y. B, the number of persons born in the net losing region that resides in the net gaining region at the beginning of the period under consideration, is a kind of measure of past migration. In the terms of the model postulated in this study, migration in the past would have been a function of provincial income differentials in the past. It has become widely recognized that regional income differentials in Canada have remained unchanged over a period of several decades (Chernick, 1966 and McInnis, 1968). Regional income differentials in the past are highly correlated with those in the present. Any measure of past migration is likely to be strongly correlated with provincial differences in income in the period under consideration. The simple correlation between B and Y is 0.46, which is not especially high but appears to be enough to reduce the effectiveness of the income variable.[54]

If B is dropped from the regression equation, R^2 falls although it remains at an encouraging level, but the coefficients of the income and distance variables become clearly significant in the predicted direction (see equation [3]).

$$N_2 = 4475 + \underset{(3.25)}{2.03Y} - \underset{(4.52)}{1.65D} + u \qquad [3]$$

$$R^2 = .61$$

The conclusion left at present is that the variable B, introduced as a proxy for the flow of information, is an effective predictor of migration but introduces multicollinearity to such a degree that it confuses the test of the economic model of migration that has been postulated. The variable cannot be used successfully to evaluate the role of information flows. That will require a better proxy variable, or at least one that is not beset by problems of multicollinearity. No such variable comes to mind. Since the result obtained with only income and distance variables, will be continued the analysis with the extremely simple but fairly satisfactory model of equation [3].

An alternative to equation [3] is equation [4] which differs in that the adjusted wage and salary earnings variable W^* is substituted for per worker personal income Y. The relative merits of these two variables are discussed in some detail in the Appendix. In brief, W^* is relatively more attractive than Y in that it is a closer representation of the earnings situation that a prospective migrant would consider as it is adjusted to take at least partial account of differences in the quality of labour. W^* has the weakness, however, that it can be obtained only for the end of the period of migration. To the extent that migration serves to reduce earnings differentials among provinces, the use of W^* involves a misspecification. It is

argued in Appendix I, however, that in the particular situation under study there was little, if any, narrowing of earnings differentials despite a large volume of migration. The use of W^* as an expedient is tentatively justified. It has greater appeal than Y on theoretical grounds.

$$N_2 = 4402 + \underset{(2.76)}{2.94W^*} - \underset{(3.95)}{1.52D} + u \qquad [4]$$

$$R^2 = .57$$

In practice there is little to choose between Y and W^*.[55]

In summary, the result of this simple regression model is that, as hypothesized, net migration increases with the size of the income differential between the provinces and decreases with distance. While the relationship of net migration to income differentials is significant it is not strong, as evidenced by the values of the coefficients of Y and W^*. Accepting for the moment the results at face value and converting in a rough way into the terms in which economists customarily evaluate such influences, the elasticity calculated at the mean values of the variables would imply that a one per cent increase in the differential wage earnings between provinces would produce, over the five-year period, only a little more than a quarter of one per cent increase in net interchange of population.

The effect of distance is more pronounced. One thousand additional miles between provinces would reduce the net interchange by about 1500 persons. To put it another way, an increase of 100 miles in the distance between provinces would require an increase of $50 in differential earnings to leave migration unchanged. That is surely greater than the marginal costs of movement so that it is reasonable to infer that something other than costs, most likely the flow of information, is an important factor in the influence of distance.

The following Sections explore several aspects of the results that might lead to improvements in the relationship.

5.7.4 MIGRATION RATIOS – Since it has been shown that inter-provincial migration in Canada, at least in the period 1956-61, is not correlated with population size, it should not be a surprise that the simple regression model considered above turns out rather miserably with the ratio of migration as the dependent variable.

$$N_2 = 2.55 + \underset{(1.21)}{.00106W^*} - \underset{(2.75)}{.00086D} + u \qquad [5]$$

$$R^2 = .34$$

The trouble lies with the western provinces which have exceptionally high migration ratios. An attempt is made to take this into account by the

introduction of a vertical shift variable, designated S, which takes on a value of *one* for interchanges between any two provinces west of Ontario and *zero* otherwise. This adjustment is reasonably successful, as indicated by [6] which produces results for ratios of net migration that are closely in line with those obtained with absolute values.

$$N_2 = .94 + .00084W^* - 00031D + 2.33S + u \qquad [6]$$
$$(1.21) \qquad (1.06) \qquad (3.41)$$
$$R^2 = .60$$

5.7.5 A NON-LINEAR RELATIONSHIP – So far, only linear relationships have been considered. This has been mainly on the grounds of simplicity since there is no strong *a priori* expectation that the relationship is likely to be otherwise. Visual examination of graphic relationships between migration and income and migration and distance (Charts 5.1 and 5.2) suggests that the relationship may in fact be non-linear. The magnitudes of net interprovincial interchanges of population are fairly widely scattered for those cases where income differentials are small. As income differentials become larger the response of migration is much clearer. If there are important costs associated with migration which are unrelated to the distance moved, net migration would be unambiguously related to income differentials only for income differences in excess of those fixed costs. A proper test of such a hypothesis could be undertaken only if estimates were available of the fixed costs associated with migration. In the absence of such information a rough indication of the likely importance of fixed costs of movement might be obtained by the use of a regression relationship in semi-logarithmic form. This kind of non-linearity is rationalized on the grounds that the effect of ignoring fixed costs is to make migration increase with income differentials and decrease with distance more than proportionally. The results of such a regression are presented in equation [7].

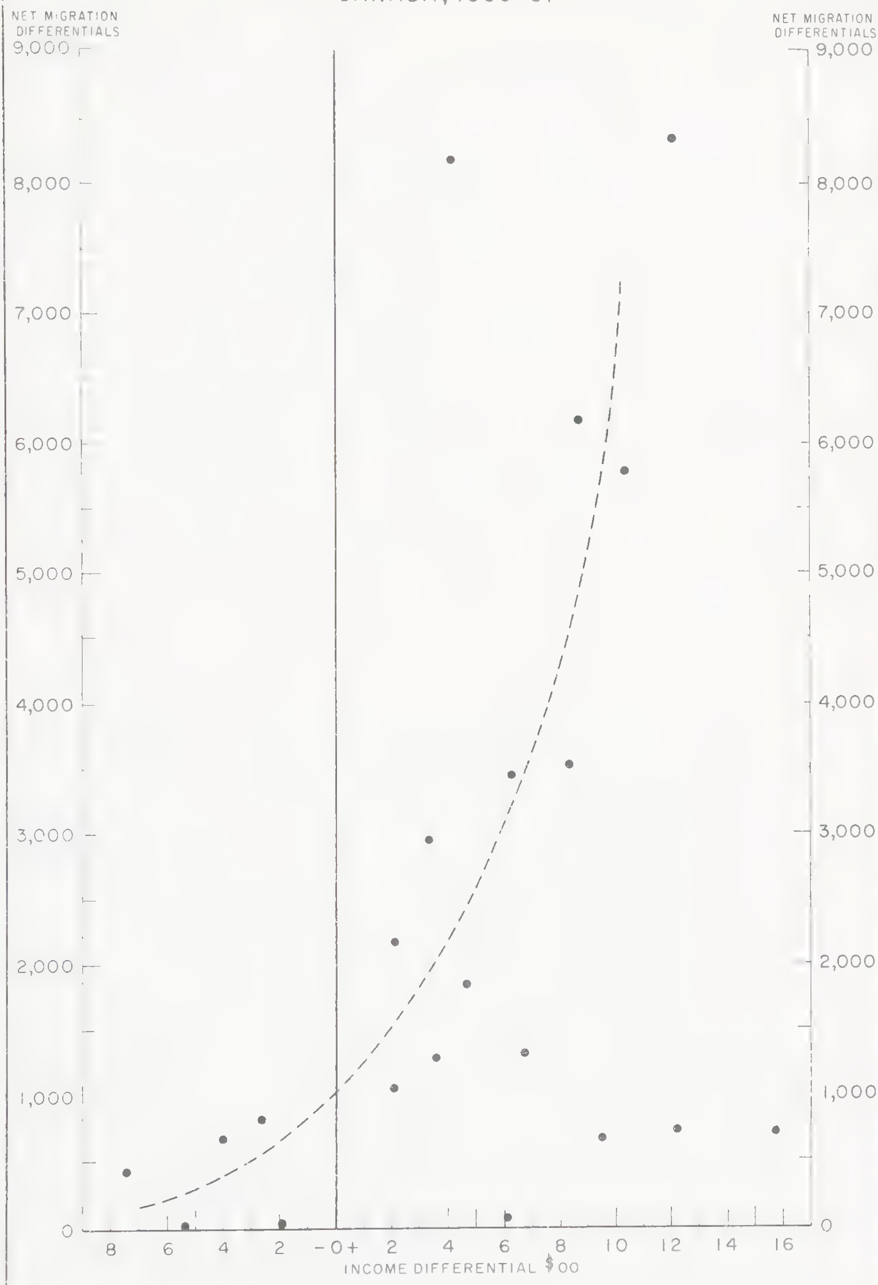
$$Log\ N_2 = 7.96 + .00234W^* - .00092D + u \qquad [7]$$
$$(3.12) \qquad (3.40)$$
$$R^2 = .54$$

The semi-logarithmic form does not appear to provide a better fit than the simple arithmetic form. Indeed there seems to be little to choose between them. The evidence at hand is apparently not adequate to discriminate between these two forms and their different implications about the importance of fixed costs of migration. The semi-logarithmic form may have a slight edge when the migration ratio is used – see equation [8].

$$Log\ N_2 = .886 + .00199W^* - .00054D + 1.78S + u \qquad [8]$$
$$(2.72) \qquad (1.73) \qquad (2.48)$$
$$R^2 = .63$$

CHART-5.1

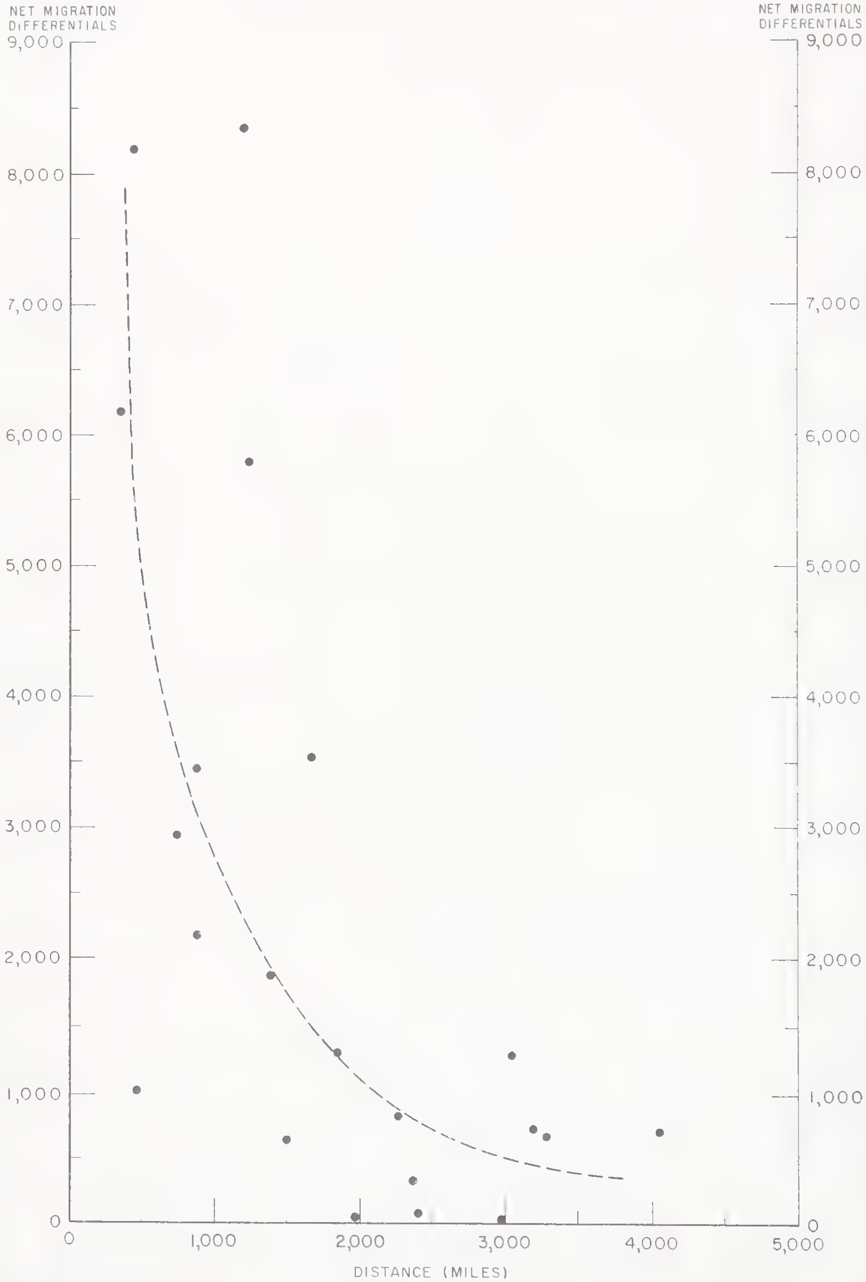
ASSOCIATION BETWEEN INTER-PROVINCIAL DIFFERENTIALS IN NET MIGRATION AND INCOME, CANADA, 1956-61



Source. Appendix Table I.2.

CHART—5.2

ASSOCIATION BETWEEN INTER-PROVINCIAL DIFFERENTIALS IN NET MIGRATION AND DISTANCE, 21 PAIRS OF PROVINCES, 1956-61



Source: Appendix Table I 2.

5.7.6 PERFORMANCE OF UNEMPLOYMENT VARIABLES – In view of the frequency with which unemployment variables have been used in other analyses of migration, some consideration should be given to their role in interprovincial migration in Canada. A host of difficulties underlies the assessment of this role. The main problem is that it is not entirely clear how unemployment fits into a theoretical model drawn from the economic theory of resource allocation. Other writers have treated unemployment variables variously as substitutes for and as supplements to differential earnings. As supplements it is not immediately evident what dimension of economic opportunity they add to what is indicated by income differentials. In some cases the use of unemployment statistics as substitutes for income data is due simply to the scarcity of the latter; but elsewhere writers have implied that labour is relatively immobile in the face of earnings differentials yet responds to the kind of disequilibrium that is indicated by unemployment. The theoretical merits of this latter argument are far from evident. On the whole, unemployment variables seem to be more ambiguous than those that involve earnings differentials. One would feel constrained to make use of them, however, if they perform empirically much better than income differentials.

$$N_2 = 4277 - \underset{(1.11)}{209.8U} + \underset{(1.78)}{584.7U^*} - \underset{(3.62)}{1.58D} + u \qquad [9]$$

$$R^2 = .52$$

The results shown in equation [9], using unemployment variables alone, are not especially encouraging. Neither U nor U^* have coefficients that are significantly different from zero, although both have the expected signs. A matter of some surprise is that the relative strength of U^* – a kind of "push" variable – is much greater than previous studies of migration would lead one to expect. These previous studies have tended to show that unemployment in receiving regions was the more significant determinant of migration. That is clearly not the case in the model applied here to the Canadian experience for 1956-61. It may be that the Canadian experience differs from that of the United States in this regard, yet it might be argued that the variable used here for unemployment in the net losing area (long-term unemployment) may be a more sensitive indicator of a fundamental kind of disequilibrium in the labour market than the more usual indicators. U^* is intended to be a measure of economic distress and in this it appears to meet with some success. This suggests the possibility of using U^* as a supplement to W^*, although it should be undertaken with caution given the distinct correlation between U^* and W^* (R = .46). It turns out that U^* does not perform particularly well. If equation [10] is compared with equation [6] introduced above, it can be seen that the introduction of U^* does not improve the fit nor is its coefficient anywhere near significant. On the other hand, it

draws enough influence away from W^* to lower the t-value for that variable. (This result is unaltered by the addition of U as well as U^*.)

$$N_2 = 4103 + 2.65W^* + 123.19U^* - 1.55D + u \qquad [10]$$
$$(1.79) \qquad (.29) \qquad (3.77)$$
$$R^2 = .57$$

5.7.7 EXAMINATION OF RESIDUALS – So far, the most satisfactory results are seen to have been achieved with the simple linear regressions of net migration on distance and differences in wage earnings or personal income – equations [4] and [3] – or with a regression of the log of the ratio of net migration on the same variables with the addition of a linear vertical shift – equation [8]. Some of the weaknesses of these models can best be seen through an examination of the differences between actual and predicted net migration.

As one would expect, large residuals are found where the direction of migration that is predicted by the model is opposite to the observed net movement. This is not an insignificant problem. Out of 21 observations, four are net flows in a direction other than that predicted by the income differential.[56] These perverse observations might be viewed as indications that there is something lacking in the theory although one has to acknowledge that a highly aggregative model will be subject to some degree of error.[57] A second source of difficulty, and one that is more serious, is suggested by the particular kind of systematic pattern that is evident in the remaining residuals. Where the model tends to underestimate by a large amount the movement between a net losing region i and another region j, it will also tend to over-estimate the net movement between i and some alternative destination k. The most important case is that of Saskatchewan from where the movement is more predominantly westward than the model predicts. For the prospective migrant from Saskatchewan, Alberta and Manitoba appear to be almost equally attractive destinations in the sense that both distance and income differentials are almost identical. Yet the movement from Saskatchewan to Alberta is almost eight times that to Manitoba. A roughly similar situation holds for the inter-changes between Saskatchewan and Ontario and British Columbia (on the basis of earnings and distance, migrants from Saskatchewan might be expected to show only the slightest preference for British Columbia over Ontario yet, again, the movement to the western regions was several times that to the east). A similar pattern is seen in the case of the Atlantic Provinces. Migration on net to Ontario is underestimated and to Quebec over-estimated. Quite clearly there is something missing from the model.

The author is not able at this time to provide a wholly satisfactory explanation of what is missing nor to adapt the model successfully, but can

only speculate about the directions in which the explanation might be sought. First, it should be noted that changing the form of the relationship has relatively little effect. In the semi-logarithmic form – equation [8] – the residuals have largely the same pattern although the problem with the Atlantic Provinces is ameliorated. One element of the missing influences might be information about economic opportunities. If the variable B is interpreted as an acceptable indicator of sources of information (an interpretation that was suggested but rejected as inappropriate), it would help to account for at least a part of the problem. The greater flow of migrants in the past from Saskatchewan to British Columbia and from the Atlantic Provinces to Ontario would imply much more information about specific job opportunities in those destinations. The residuals are indeed smaller and have a less pronounced pattern for the regression equations that include B. There remains, however, a strikingly large underestimate of the movement between Saskatchewan and Alberta and a corresponding over-estimate of migration between Saskatchewan and Manitoba. This one pair of residuals stands out as by far the largest to be accounted for and most likely non-random.

One broad generalization that might be considered is that regions where employment, especially employment in non-agricultural industries, is expanding relatively more rapidly will be regions that have more job opportunities for a given income differential and will therefore tend to be more attractive destinations than their earnings differentials would indicate. Lowry, 1966, ch. III, emphasizes this variable strongly but is has obvious problems of causal interpretation. Except for the particularly striking case of migration from Saskatchewan, such a hypothesis does not turn out to be very useful. The fact that growth of employment does not provide a general improvement of the regression results but does sharply reduce the residuals for the inter-changes between Saskatchewan and Alberta and Manitoba strongly suggests that the large movement of population out of Saskatchewan into neighbouring provinces is a phenomenon that differs in nature from the observed inter-changes between other provinces. For the most part, inter-provincial migrations are long-distance, inter-regional movements. However, it might be argued that the Prairie Provinces actually constitute a single, structurally integrated economic region. That being the case, a large fraction of the observed migration between the three Prairie Provinces might then be interpreted as movements from the rural parts of the region (largely Saskatchewan) to the urban centres of the region (located mainly in Manitoba and Alberta). Differences in rates of growth of job opportunities may be more important for such shorter-distance, intra-regional migration. The movement from Saskatchewan, then, may be poorly accounted for by the model used here because it is fundamentally a different kind of migration.

5.8 AGE AND INTER-PROVINCIAL MIGRATION

In contrast to most previous studies of internal migration, the present analysis attempts to examine patterns of migration and the economic determinants of those patterns for particular age classes of the male population. Marked age differentials in migration have long been widely recognized. A large proportion of migrants is typically concentrated in the younger adult ages. It would not be surprising if the determinants of migration varied among the different age groups. In relation to the economic determinants of migration one would expect, at first glance at least, to find that young males are more responsive to earnings differentials and less deterred by distance than older males. The shorter working life remaining to older males, over which they could reap the benefits of migration, should lead them to require larger differentials in earnings to induce them to move. Older workers would also tend to have more dependants and possibly a greater likelihood of incurring capital losses on their real property. Thus, costs of movement are probably greater for them. To the extent that costs vary with distance, the deterrent effect of distance should be greater for older workers. Furthermore, the older age groups are more likely to include those who, having attempted a move, are disappointed with the consequences and are returning to the region with lower average income. In general, the economic model of migration should apply pre-eminently to younger males.

The fragile nature of the 1961 Census statistics of migration requires that a note of caution be posted. The extent to which migration relationships can be explored for specific age groups is narrowly limited. For some ages the numbers of migrants between pairs of provinces are very small and the focus on a narrow age group may compound the effects of errors of enumeration. Both errors of enumeration and the sample design may have tended to produce a considerable underestimation of migration by males in the younger age groups, especially 25-34.[58] It should be admitted at the outset that errors in the data may be too great for a viable regression analysis of migration by age.

The examination of migration by age was carried out by estimating regression equations for four age groups: males 15-24, 25-34, 20-44 and 35+, identified respectively as N_3, N_5, N_6 and N_7. The overlapping partly dulls age differentiation but has the advantage of somewhat diminishing the effects of enumeration error. The third class, N_6, is included partly to provide continuity with the focus on that age class in the analysis of migration that was undertaken for earlier decades. Several different specifications were explored. Results are shown in Table 5.13 for each age group for three specifications which provide the most generally interesting results. The first of these is the simple linear model that relates the obsolute value of

Table 5.13 – Regression Results, Inter-provincial Migration of Males by Specified Age Group, Canada, 1956-61

Dependent variable[a]	Constant term	Regression coefficients[b]					R^2[c]
		W^*	D	S	U^*	U	
Males aged 15-24 –							
N_3	1,104	1.10	– 0.44	–	–	–	0.41
N_3	699	–	– 0.51	–	290.56	– 45.40[d]	0.47
$log\ N_3$	– 0.29	0.0019	– 0.0005[d]	1.60	–	–	0.64
Males aged 25-34 –							
N_5	864	0.53[d]	– 0.29	–	–	–	0.40
N_5	732	–	– 0.32	–	119.21[d]	– 22.50[d]	0.40
$log\ N_5$	– 0.31	0.0011[d]	– 0.0003[d]	1.33	–	–	0.47
Males aged 20-44 –							
N_6	2,087	1.51	– 0.71	–	–	–	0.47
N_6	1,544	–	– 0.78	–	452.13	– 103.91[d]	0.54
$log\ N_6$	– 0.47	0.0019	– 0.0004[d]	1.55	–	–	0.53
Males aged 35 and over –							
N_7	1,185	0.71	– 0.40	–	–	–	0.56
N_7	1,463	–	– 0.38	–	56.02[d]	– 62.72[d]	0.47
$log\ N_7$	– 1.36	0.0021	– 0.0004[d]	2.08	–	–	0.69

[a] See text (Section 5.7.8) for definitions of these variables.
[b] See Table 5.12, footnote [a] for definitions of the symbols.
[c] Square of multiple correlation coefficient.
[d] t-statistic is less than 2.
SOURCE: Appendix I, Table I.2.

net inter-changes to differences in wage and salary earnings and distance. Results for the ratio of migration, with a dummy variable included for migration among western provinces, are not shown but they do not differ appreciably from those with the absolute value of migration as the dependent variable. The second form for which results are shown substitutes unemployment variables for differential earnings. These results may be of interest in comparing the present study with others which emphasize the role of unemployment. The third set of results are for the regression of the logarithm of the ratio of migration on distance, earnings differentials and a dummy for migration among the western provinces.

In relation to initial expectations, the results shown in Table 5.13 are somewhat puzzling. For any of the specifications tried, the best fits of the models were obtained for older males (35 years and over); the poorest fits were obtained for the age group 25 - 35, which includes the peak ages of migration. For the latter group the model actually predicts rather poorly. On the other hand, the result for males aged 35 years and over provides a reasonably strong confirmation of the model.

The very weak result for males aged 25 - 34 is indeed puzzling and may raise doubts about the entire analysis. It is not clear just how seriously this result should be taken. None of the equations that were fit for the age group 25 - 34 produced an R^2 over *.50*. In general the *t*-values of the estimated coefficients for W^* or U^* are not high enough to reject the hypothesis that the coefficients are *zero*. Alternative specifications make little difference.[59] It is not impossible, and indeed rather probable, that the statistics of migration for the age group 25 to 34 years are especially subject to measurement errors. The data that are employed may not be up to the tests that are attempted. Yet reasonably good results appear to be obtained for younger (15 - 24) and older (35+) age groups. Can we accept these and throw out the adverse case of the 25 - 34 year age group? The age group 20 - 44 should be less subject to error.[60] The results for this broader age group are better, although still not especially strong.

Accepting these results at face value, they might be rationalized along the following lines. The kind of economic model used here may not be as suitable for the young adult age group and problems of aggregation may be relatively more severe. Ages 25 - 34 are years of fairly high occupational mobility and of rather widespread searching-out of careers. Survey statistics for individual migrations would help greatly in clarifying behaviour during these ages. This age group may also include a much higher proportion of non-volitional moves such as those involving job changes within the same firm. For reasons such as these, the migration of this group may be less clearly deliberate with regard to differential economic opportunity, especial-

ly as revealed by aggregate data, than the migration of groups that are both younger and older. However one attempts to solve this puzzle, and the author has not got very far with it, it must for the present remain a serious limitation on the results of the present study that the most active migrant group has proved most difficult to encompass within the explanation proffered.

To return to the most positive findings of the study, the response of net inter-provincial inter-changes of population to earnings differentials does seem to diminish with age and older workers do seem to be more deterred by long distances. This is seen most easily in the elasticities of migration with respect to earnings differentials and distance, computed at the mean values in the linear-arithmetic regression equations shown in Table 5.14. The result here is in accord with theoretical expectations.

Table 5.14 – Per Cent Change in Net Interchange of Migrants Between Pairs of Provinces Associated[a] with a One Per Cent Increase in W^* and D[b], Canada, 1956-61

Age group	W^*	D
15-24	0.53	– 0.73
25-34	0.31	– 1.09
20-44	0.33	– 1.10
35 and over	0.28	– 1.14

[a] The elasticity is calculated at the mean values of the variables.
[b] These are the earnings (W^*) and distance (D) variables defined in the text.

SOURCE: Table 5.13.

An additional result of some interest is that the semi-log form appears to provide a distinctly better fit for the 15-24 and 35-and-over classes but not for the intervening age groups. This could be interpreted as a reflection of the likelihood that the particular economic model used here, although applicable to the younger and older groups, is not adequately specified for application to the middle age group (25-34 or 20-44) in any of the forms examined. While this may be, the rationale for the semi-log form was that fixed costs of migration might be significant. One would expect fixed costs to be higher for older males. For males in the 15-24 age group, fixed costs may not be so important but with imperfect capital markets younger persons may find it more difficult to finance movements.[61]

A final result of age differentiation that should be of some interest is the variation with age of the influence of unemployment variables. The

substitution of the unemployment variables, U and U^*, for earnings differentials works reasonably well for younger but not for older males. For the age group 15 - 24, the unemployment variables perform about as well as income differentials. It is also notable that the significant unemployment variable is U^* – long-term unemployment in the net losing region. This suggests a different interpretation of the influence of unemployment than is usual. U^* is considered to represent structural maladjustments or fundamental disequilibria in the labour market. It is evidently the young people who react most strongly to economic distress by moving to better opportunities elsewhere. For older workers (35 and over), migration depends much less on unemployment than on income differentials. Moreover, of the two unemployment variables, U is as effective as U^*.

5.9 MIGRATION AND EDUCATION

A special tabulation of the 1961 Population Sample provides statistics of inter-provincial migration by levels of educational attainment of the population. It has to be conceded immediately that these data may be heavily dominated by enumeration error and, if used at all, must be used only in the most tentative way. In the matrices of provincial inter-changes of persons of specified age and schooling many of the cells fall below 50. To use these data at all means placing real strains on the bounds of reliability. But the temptation to use them is too strong. There has been so little done in the way of analysis of migration at this level of detail that, with every qualification, it seems worthwhile to push ahead.

The regression relationships between migration, income differentials and distance discussed in foregoing Sections were estimated for each of four particular groups of inter-provincial migrants – males aged 25 - 34 with elementary schooling, males aged 35 and over with elementary schooling and each of these two age groups for males with secondary schooling.[62] Greater age detail is not available in the tabulation. Migrants with college education were too few in number to provide a reliable body of data for regression analysis.

The regression results are summarized in Table 5.15. In some respects these results are striking but that may reflect the weakness of the data as much as anything else. The results are presented for their interest in a full realization that they should not be accepted unquestioningly. The main thing that does emerge from the estimates shown in Table 5.15 is that the economic model of migration behaviour applies very differently among workers with different age and educational attainment. The most interesting result is that the model appears to give a much better explanation of the migration of persons with only elementary school education than it does of persons with

Table 5.15 – Regression Results, Inter-provincial Migration of Males by Age and Educational Attainment, Canada, 1956-61

Dependent variable[a]	Constant term	Regression coefficients[b]				R^2[c]
		P_2	W^*	D	S	
Males 25-34 with elementary schooling						
N_{21}	33	0.18[d]	0.075	−0.032	–	0.58
$\log N_{21}$	2.28	0.0048[d]	0.0024	−0.0009	–	0.42
Males 35 and over with elementary schooling						
N_{22}	117	0.01[d]	0.06	−0.04	–	0.57
n_{22}	0.089	–	0.000[d]	−0.000[d]	0.36	0.70
$\log N_{22}$	4.66	−0.0004[d]	0.0017	−0.0010	–	0.79
Males 25-34 with secondary schooling						
N_{31}	69	0.04[d]	0.06[d]	−0.021	–	0.26
$\log N_{31}$	3.35	0.0026[d]	0.0011[d]	−0.0003[d]	–	0.24
Males 35 and over with secondary schooling						
N_{32}	142	−0.07[d]	0.04[d]	−0.031	–	0.27
n_{32}	0.04	–	0.000[d]	0.000[d]	0.66	0.77
$\log N_{32}$	4.31	0.0003[d]	0.0011[d]	−0.0006	–	0.35

[a] See text for definitions of variables.
[b] See Table 5.13, footnote [b]. "S" is the dummy variable explained in the text.
[c] Square of the multiple correlation coefficient.
[d] t-statistic is less than 2.

SOURCE: Appendix I, Table I.2.

secondary schooling. The close fit for males aged 35 and over with elementary schooling is striking. The very simple model used accounts for a large proportion of the variation in migration. The deterrent effect of distance is high and the reaction to earnings differentials is fairly strong. The t-values of the coefficients of both variables leave little question about their significance (for the relationship in semi-logarithmic forming the t-value of the coefficient of W is 4.7 and that of D is 6.3). On the other hand, the migration of the same age group with secondary schooling is very weakly related to differential wage earnings. The coefficient of W is of doubtful significance. Distance performs a little better than W and appears to constitute less of a deterrent for the better educated than for those with only elementary school

education. But for the group with secondary schooling, the model accounts for a very much smaller share of over-all variation. The difference here is so striking that some effort must be made to rationalize the result.

The general expectation would probably have been that a purely economic model of migration would give better results for a more highly educated group than for persons with only elementary schooling. The results of this study indicate that the reverse may be the case. With all the cautions about the migration data that were introduced above, it should be recognized at the outset that much reliance should not be placed on these results.[63] The indication is, however, that for the better-educated group something important is missing from the model. It is not entirely clear what this is but one hypothesis might be that the group with secondary schooling may involve a substantially higher proportion of "non-volitional" moves. People with only elementary education may be more inclined to move to obtain jobs than to move within their existing jobs. In the absence of data for individual households, it is not really possible to evaluate this interpretation. Alternatively what may be at work is simply the severe constraint on persons with little education, who tend also to have lower average earnings, to move out of sheer necessity to better income positions. Persons who start with better incomes, and who tend to have higher levels of schooling, may have greater latitude to pursue other desires.

At the very least it must be recognized that these results raise important questions. It may not really be possible to take them seriously, but they point to a re-thinking of the economic model of migration which underlies this research. Can it really be believed that persons with less schooling are more strongly motivated to migrate in the face of differences in earnings than persons with higher levels of schooling? Or is the aggregation problem more severe for persons with secondary school education? Even a little occupational detail would go a long way in helping to clarify this. One thing that should be pointed out is that introduction of the variable B, representing the availability of information, greatly improves the explanation of migration for males aged 35 and over with secondary schooling.

$$N_{32} = 33 - .23P_{32} - .029W + .013D + 2.08B + u \qquad [11]$$
$$(4.87) \quad (1.34) \quad (1.39) \quad (7.26)$$
$$R^2 = .83$$

This may be a persuasive point in favour of the dominance of scarce information flows over more directly economic variables. It seems premature to reach any real conclusions about this and it is really very doubtful that many conclusions can be reached with the data on migration that are currently available.

FOOTNOTES TO CHAPTER FIVE

[1] Thus it should be easier to predict the predominant direction of flow of migrants, especially on net, in a given situation than to predict the move of a particular individual.

[2] There is a voluminous literature on this subject. A highly useful statement of the theory in very general and fully articulated form is provided by Michael J. Brennan (1965, pp. 45 - 64).

[3] Such changes have a great variety of sources. They might result from changes in consumption patterns or in technology. A factor frequently stressed in Canadian economic history is the changed profitability of staple export commodities.

[4] Some writers have given the flow of information an over-riding importance in their discussions of labour migration; see especially Richard Nelson, 1959.

[5] An important consideration in out-migration from a generally depressed area is that, regardless of distance, movement may require incurring capital losses, as in selling farm property.

[6] This changing balance between the existing distribution of population and the distribution of new opportunities that inevitably occurs as a part of the process of economic growth has been ably described by Simon Kuznets in a number of writings — in particular Kuznets, 1964.

[7] This "staple thesis" is most widely associated with the work of Harold Adams Innis but is the model employed in both the Innis, 1954, and the Easterbrook and Aitken, 1956, texts. It received substantiation by Caves and Holten, 1959, but is not without critics. See Kenneth Buckley, 1958, and E.G. Chambers and Donald Gordon, 1966.

[8] In a simple model with two regions, our hypothesis is that population will tend to migrate from the region with lower to the region with higher income level. Where there are more than two regions, the same tendency should hold but it does not permit the prediction of the sign of net migration for any but the lowest and the highest regions in the income ranking.

[9] There might be some interest in looking at even narrower age groups for which the pattern might commonly differ from that for the whole population. The selection of the age group 20 - 44 was based on two considerations. As already pointed out, this age span encompasses the peak of years of migration and especially of the migration that would be expected to be most clearly determined by economic factors. It is a reasonably broad age class, though, so that the impact of errors in the migration estimates is lessened. Estimates of migration made by the Life Table Survival Ratio technique are quite sensitive to enumeration errors in the census. Young males (20 - 24) tend to be under-enumerated relative to males 10 years older, suggesting that migration will be underestimated for males aged 20 - 24 and over-estimated for males aged 30 - 34. The estimates for each age group standing by themselves could be particularly misleading but in combining the two groups, the errors partly cancel.

[10] But it might be noted that each of the three Prairie Provinces continued to experience positive net migration of males aged 20 - 44.

[11] An estimate of migration of the Canadian-born between two provinces over an intercensal decade can be obtained by subtracting the population born in province *j* but residing in province *k* at the beginning of the decade from that at the end of the decade. The resulting change in *j*-born residing in *k* differs from migration of *j*-born to *k* over the decade by the number of deaths to *j*-born that were resident in *k* in the initial year, return migration of *j*-born from *j* to *k* and the interchanges of *j*-born between *k* and other provinces or countries. For any of these reasons, the change in the birth/residence index may, in any particular situation, be a poor estimate of migration.

[12] The exception is a most unfortunate one since it is for the period with the highest rates of migration and the greatest impact of immigration.

[13] The figure for immigrants also includes Canadian-born returning from residence in other countries.

[14] The point must be kept clearly in mind when considering such questions as why the out-migration from Quebec and the Maritimes has not been larger.

[15] The statistics of Tables 5.1 and 5.2 make the first decade of the period stand out. The estimates for 1911-21 are probably biased downward however. The Life Table Survival Ratio method of estimation does not take into account the influenza epidemic of 1918 or deaths due to World War I. The latter show up in a pronounced downward bias to the estimates for males aged 20-44.

[16] It is curious that for Quebec the net migration of males aged 20-44 should be so much lower in relation to the figure for the whole population than it is for other provinces. There is no ready interpretation for this phenomenon and caution should be taken in making such comparisons with net migration statistics. The detailed statistics for Quebec of net migration by age indicate fairly heavy in-migration at the older ages contrasted with out-migration or negligible in-migration of younger adults. It is a temptation to interpret this as return migration from the United States but the evidence is not available.

[17] More information would be desirable about the relative severity in Quebec of the influenza epidemic of 1918.

[18] The modest intercensal net loss of Quebec-born to other provinces in 1941-51 suggests that the main destination was the United States.

[19] The negative net migration for Saskatchewan is disproportionately female. Among males, the net out-migration is almost entirely of very young men, aged 15-24.

[20] Many writers refer to this measure as "earned" income, a designation having implications that are better avoided. The name "participation income" is due to Kuznets.

[21] Wherever possible provinces rather than regions are used in the computation since with only five regions the coefficient of rank correlation must be 1.00 to be accepted as significantly different from zero at even the 0.05 level.

[22] Note that the use of the income level at the beginning of the decade rather than the average level of income during the period of migration implies a lag in the response of migration to changing income differentials .

[23] Mining seems best treated as an industrial rather than as a rural occupation. Forestry is a more difficult case since in different times and places it has the characteristics of both classes. It is included here with industrial occupations.

[24] In 1921 - 22, the earliest year for which reliable statistics are available, the crude birth rate in Quebec was 30 per cent above the average for the nation and almost double the level for British Columbia, the province with the lowest birth rate.

[25] It is interesting, however, that it is this decade for which Farrar, 1962 obtains the closest relationship between migration and prior natural increase.

[26] Several bits of evidence support this contention. Average wage and salary earnings for 1900 - 01 were enumerated in the 1901 Census and published in Canada, Census Bureau, 1907. The advantage of the western region stands out in these data. The Maritimes and Quebec appear to have been relatively better off in 1901 than a decade later. In a general way that pattern for 1901 appears in statistics of the average wages and salaries per employee in manufacturing establishments (*Canada Year Book 1906*, p. 144) and the average salaries of school teachers (*Canada, Year Book 1906*, p. 160).

[27] The 1901 Census statistics of wage and salary earnings per worker show British Columbia at least 60 per cent above the national average. Besides the higher levels of prices in that province, the abnormally low ratio of dependants to workers inflated the differential in 1910 - 11.

[28] Although free land and the agricultural potential of the region must be recognized as the fundamental basis for the attraction of settlers, the many job opportunities in the developing urban trading and service structure of the region were important immediate attractions to migrants.

[29] Care must be taken in interpreting these figures. Some, at least, of the Ontario-born migrants to Saskatchewan and Alberta would have migrated from provinces other than Ontario — especially Manitoba.

[30] Precisely that stronger and more restrictive formulation of the theory is resorted to in Section 5.5 as one (but only one) of the relations analysed by regression techniques.

[31] Note that the disproportionate share of Prairie settlers from Ontario is a phenomenon of the first decade of the century only. The proportion originating in Quebec rose and that in Ontario fell sharply in 1911 - 21.

[32] This interpretation is consistent with what the author earlier believed was dubious evidence that income per worker in Quebec agriculture in 1910 - 11 was very little different from Ontario agriculture (cf. McInnis, 1968, Table A - 4).

[33] The argument applies mainly within Ontario. The pressure on agriculture should have been more intense in the wheat-growing areas of western Ontario than in the dairy-farming areas of eastern Ontario. The number of persons engaged in agriculture was declining everywhere in Eastern Canada, but the fall does seem to have been relatively greater in the wheat-growing districts. The rural population of Grey, Bruce and Huron counties declined by more than 15 per cent from 1901 to 1911. On the other hand counties such as Renfrew and Glengary, which were generally thought to be much less prosperous agriculturally, experienced declines of only seven per cent.

[34] Statistics are not available on the county of birth or of previous residence but personal familiarity with many Saskatchewan residents who originated in Ontario has left the author impressed by the high proportion that seems to have come from Grey, Bruce and Huron counties. Casual empiricism can be very misleading, so the argument put forth here should properly be regarded as an untested hypothesis.

[35] The change in the number of French-speaking Canadian-born in the United States during this period does not point to a large emigration from Quebec either.

[36] A fairly persuasive case has been made by Caves and Holton, 1959, pp. 182 - 188. Much more would have to be known than at present, however, for the argument to be completely convincing.

[37] Mackintosh, 1939, briefly hints that this was not one of British Columbia's better decades but does not pursue the matter. For the most part, even the broad dimensions of the alteration in trend do not seem to have been recognized.

[38] There is actually a considerable amount of raw material but very little of it has been worked over and put into generally usable form.

[39] This evidence should not be cited without qualification. Concern has already been expressed that the estimates of migration for 1911 - 21 may have a downward bias, probably because they do not account adequately for war deaths. This might have a serious effect on the estimate for British Columbia. On the other hand the migration estimates are consistent with the evidence or work force statistics referred to above in the text.

[40] The isolation of British Columbia from the rest of Canada was not much of a deterrent to migration. That province was able readily to draw migrants from the Prairie region where the relative attractiveness of migration had deteriorated: by far the greater proportion of Canadian-born migrants to British Columbia came from the Prairie Provinces.

[41] The author has already questioned the accuracy of the negative net migration for males aged 20 - 44 in the period 1911 - 21. If, in fact, that estimate is in error the decade of the 1930s stands uniquely.

[42] The rate of out-migration from Nova Scotia fell so low that, at the end of the decade, an influx of military personnel at the outbreak of World War II turned migration positive for the whole decade.

[43] Net migration was positive for Quebec and Manitoba. Both lost Canadian-born in the net exchange with other provinces.

[44] Net out-migration from Saskatchewan was particularly heavily concentrated among young people at the ages when they marry or take their first jobs. The potential pressure on labour supply had eased by 1961.

[45] No mention is made of the consequences of government policy for inter-regional migration in Canada. The substantial package of policies aimed at supporting the economy of the Maritimes, especially Nova Scotia, may very well have been effective in reducing migration out of the area.

[46] Males aged 10 - 19 were no less than 48 per cent of the total male labour force in New Brunswick in 1951. The highest ratio ever achieved by Quebec was 42 per cent in 1901. In relative terms, a previous high of 30 per cent above the national average was attained both by Quebec and Prince Edward Island in 1911.

[47] It should be noted, however, that the principal movement of migrants born in Prince Edward Island has been to Ontario, not to the urban centres of the Maritime Provinces.

[48] Migration of labour from a region of low wages to one of high wages need not, as is commonly supposed, reduce the wage differential. The marginal analysis that leads to such a conclusion assumes a constant demand for labour in both regions. Where migration is on a large scale, such an assumption is hardly tenable.

[49] It is not clear at this time what differentials in average income among provinces would be consistent with an equilibrium in the labour market wherein there was no further inducement to migrate.

[50] This source of information has been described in foregoing chapters. There is no need to review here the relative strengths and weaknesses of these data. Direct census data on migration were made available in the 1941 Census of Canada but, to the author's knowledge, no use has previously been made of them for the kind of regression analysis undertaken here with the data for 1961. Some results have been obtained by the author from the 1941 statistics but they cannot be presented here.

[51] This statement is worded deliberately to avoid any implication that the whole cost of migration should be charged against the earnings differential in the current year.

[52] The rationale for this specification presumed that the size of the population base would have an influence but that the use of the ratio as a dependent variable involves the excessively restrictive assumption that the coefficient of P_2 is actually one. In equation [*1*] the coefficient is distinctly less than one and not really significantly different from zero.

[53] An example might serve to make the argument clearer. A farmer in a poor district of rural Manitoba might be considering a move to a better-paying city job. He moves to Winnipeg because he is fairly familiar with conditions there. He has relatives there and friends who have previously migrated and who inform him he can decidedly increase his earnings. What he does not know, or knows only in an imprecise way, is that the same job he will take in Winnipeg is available in, say, Hamilton at an even higher wage. If he were a rational maximizer of earnings with complete information he would migrate to Hamilton. Because his information is limited to a specific opportunity open in Winnipeg, he moves there. Since he would undertake the move only if the city job is, in fact, an improvement upon his present position, the migration is still from a low to a higher income location, but it is not to the highest alternative income.

[54] It is interesting that Nelson, 1959, pp. 49-51, in making a case for the role of information stands this argument on its head. He argues that the role of information flows as measured by the numbers of "friends and relatives" in prospective destinations would be shown even more strongly were it not that B is a direct result of past migration which in turn is correlated with income differentials.

[55] Equation [*3*] using Y provides a slightly better fit than equation [*4*] which uses W^*. The coefficient of Y is more strongly significant than that of W^* but the evidence is not sufficiently conclusive to establish a clear preference for Y over W^*.

[56] Population moved, on net, from Manitoba and Saskatchewan to the Atlantic Provinces and from Manitoba to Quebec, despite the lower average levels of earnings in the net gaining regions. The same situation prevailed in a net movement from Ontario to Alberta. These inverse movements are relatively small but they tend to produce rather large residuals.

[57] Net migration from higher to lower income provinces is found in cases where the streams of migration in both directions are small and where the composition of the migrant population is most likely to differ significantly from that of residents.

[58] The share of migrants in collective households, excluded from the sample, would tend to be high. The under-enumeration of younger males in 1961 was serious, especially in some of the areas that are major destinations of inter-provincial migrants.

[59] The correlation can be improved substantially by the inclusion of B, the "friends and relatives" variable, but this does nothing to strengthen the influence of W^*.

[60] Many of the suggested kinds of error are common to both groups but sampling variation should be lower for the broader age group and there may be some cancellation of the effects of enumeration error.

[61] It should be kept in mind that the age group 15 - 24 includes some of the dependants of older migrants.

[62] One difference from the previous analysis is the use of age-specific earnings differentials unadjusted for occupational composition. This variable is identified as W rather than W^*.

[63] Sampling variability is high and errors of enumeration may be such as to render any analysis impossible. The fact that the results are not generally poor may give us some confidence. There are indications, however, that enumeration error may vary systematically among groups in the population.

Chapter Six

SOME ECONOMIC ASPECTS OF CANADIAN RURAL FARM MIGRATION 1956 - 61

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6.1 RURAL FARM MIGRATION AS AN ADJUSTMENT TO ECONOMIC CHANGE

The migration of the rural farm population is one aspect of the process of economic growth and structural change (Kuznets, 1964, pp. xxii-xxxv) within the Canadian economy. This growth arises from the expansion in aggregate demand in the economy produced by population growth, income growth and technological change. Structural change occurs in response to different rates of expansion of demand for the output of different sectors in the economy and consequently different sectoral rates of growth in the demand for factors of production. When the rate of growth of a factor of production in a sector (in this case population or labour force in agriculture) differs from the rate of growth of demand for the factor of production, levels of economic opportunity and factor returns tend to change. Migration is the response of population to the patterns of opportunity and return that emerge.

Spatial and sectoral differentials in per capita income may be important elements in explaining the magnitude and direction of net migration flows. These income differentials may indicate patterns of opportunity and benefit to potential migrants. Per capita incomes are, in fact, indicative of the price established in the market for labour services by conditions of supply and demand. The supply of labour, and the rate of growth of that supply, in one market or sector comes from both natural population increase and net migration. The demand for labour is derived from the demand for its output. The nature of the demand for agricultural versus

non-agricultural products, and rates of natural population increase in the two sectors, may thus indicate the patterns of income differentials and migration flows that can be expected.

In the Canadian economy, the growth in demand for the output of non-agricultural sectors has exceeded that for the agricultural sector. Manufactured goods and services tend to have relatively high income elasticities of demand,[1] particularly with incomes rising from relatively high levels. Both rising incomes and population growth, by expanding the demand for non-agricultural products, have created an expanded demand for labour in non-agricultural sectors. This increased demand for labour and the expansion of labour productivity as a result of technological advance have produced expanded economic opportunity and rising incomes in non-agricultural sectors.

The income and price elasticity of demand for agricultural output in Canada is low. Certain quality food products such as meats and poultry demonstrate substantially higher income elasticities of demand than the total agricultural output while income elasticities for cereal crops may be negative (Caves and Holton, 1961, p. 434). Increasing incomes also tend to produce increased consumer demands for partly prepared foods, and may thus increase actual outlays for food without contributing directly to the demand for farm products. In this elasticity situation, the basis growth in the demand for farm products comes from population growth as long as purchasing power per capita does not decline with this population increase.

If the growth in agricultural demand is closely tied to population growth, the rate of natural increase of the farm population may be more than agricultural activity can absorb. The rate of natural increase of the farm population has, in the past, exceeded that of the non-farm population and thus that of the total population (Anderson, 1963). This implies a rate of growth of farm population that may exceed the rate of growth of demand for agricultural products. Assuming for the moment that technological change in agriculture occurs at a rate that just maintains the physical productivity of this increased farm population as it is absorbed into agricultural activity, the resultant increase in the supply of farm output might exceed the increase in the demand for farm output and thus depress farm prices, reducing average agricultural incomes. On the basis of a constant physical productivity assumption it then appears that some part of the natural increase of the farm population may be regarded as surplus population.

Adopting a more realistic assumption of substantially increasing labour productivity in agriculture (Drummond and MacKenzie, 1957, pp. 90-91) has the effect of indicating an even greater surplus population

than would exist under constant productivity. Any increase in the physical productivity of the population in agriculture would produce an even greater supply of agricultural products and further depress agricultural prices. This latter price fall, as a result of the low (<1) price elasticity of demand, would in fact result in an aggregate agricultural income below that received with only constant physical productivity. The combined effects of natural population increase and technological improvement in agriculture, if absorbed into agricultural activity, would be to produce substantial declines in average agricultural income, thus indicating a substantial surplus of farm population.

For the Canadian economy in the 1930-55 period, data on population growth and on productivity change in agriculture give some indication of the adjustments in the size of farm population required to maintain average farm incomes. In this period, the increase in the Canadian population was 54 per cent (Drummond and MacKenzie, 1957, p. 29) which indicates an approximately equal percentage expansion in the demand for agricultural output. Estimates of changes in labour productivity in agriculture, for the same period, indicate an increase of between 75 per cent and 100 per cent in the volume of output per man (Drummond and MacKenzie, 1957, pp. 90-91). On the basis of this demand-supply information, it would appear that the farm population at the beginning of the period, if it adopted new production techniques, could more than satisfy the increased demand for agricultural products. The increased supply resulting from increased productivity, inasmuch as it exceeded the expansion of demand, might produce a decline in agricultural prices sufficient to reduce both average and aggregate agricultural income. If average agricultural income levels are to be maintained, agricultural activity can neither absorb the natural increase of the farm population nor continue to employ a population as large as that at the beginning of the period.

In this situation, there are two essential patterns of adjustment that individually or in combination operate to maintain or increase the average income levels in agriculture. The first, and most obvious perhaps, is the withdrawal of labour and some land resources from agriculture at a rate sufficient to maintain average agricultural incomes. The withdrawal tends to reduce the number of farm operators and labourers while limiting the rate of growth of total agricultural output to approximately that of the growth of total population.[2] Average agricultural incomes increase as a result of combined effects of reduced farm population and steady-to-slightly-increasing aggregate agricultural income. Examples of the withdrawal of land resources and labour include both complete abandonment of farms and adoption of part-time farming where non-agricultural income

sources contribute an increasing proportion to the total income of the farm population.

The second pattern of adjustment, which occurs simultaneously with the first to some extent, involves reorganization. Greater specialization is taking place in products such as meats, which have relatively high income and price elasticities of demand. Combined with this is an adjustment of factor proportions, using more land and capital per unit of labour in order to increase labour productivity. Increased employment of capital equipment, machinery, buildings and livestock has involved substitution of capital for labour on existing holdings plus consolidation of land areas when some operators withdraw completely. This reorganization concentrates agricultural activity on products of greater demand expansion and forces the withdrawal of some part of previous labour input.

Within the Canadian economy, the observed patterns of agricultural adjustment vary considerably between regions. Part of this variation is attributable to different qualities and distributions of land resources, part to differing socio-cultural and political circumstances and part to regional differences in economic structure. These regional patterns will be considered briefly since they are important in determining the role of spatial population relocation in rural farm population adjustment.[3]

In the Maritime Provinces, the fertility and geographic distribution of land resources appear to be largely unsuitable for extensive reorganization utilizing modern techniques; for example, there are some areas where resources permit specialization in potatoes and apples. Many areas, however, do not have this alternative and agriculture has been completely abandoned as a result. In addition, the relatively high proportion of farm income from non-farm sources (DBS, *1958 Farm Survey Report*, Table 13) illustrates the attempts of farm operators to maintain their income levels through part-time farm and part-time non-farm employment. Inability to effectively reorganize agriculture plus the recent growth in non-farm activity in this region might be expected to produce relatively large net shifts of population out of agriculture.

In Quebec, there appear to be two patterns of adjustment in agriculture based partly on land resources and partly on socio-cultural and political situations. In the St. Lawrence area, reorganization has occurred involving mechanization, consolidation of land area and withdrawal of labour input. In the Appalachian and Laurentian areas, however, land resources are much less suited to widespread mechanization and there appears to be a more rigid socio-cultural framework. Both these factors have tended to retard the release of labour and agricultural reorganization. In these areas, part-time farming with seasonal non-farm employment

appears to be a more important part of the adjustment to low agricultural income than is migration. Dealing with the province as a unit, the importance of spatial population redistribution in agricultural adjustment may be reduced by the inertia of the population.

Agricultural resources in Ontario for the most part are well suited to reorganization and mechanization. There are some marginal areas where this does not apply but agriculture has been partially or totally abandoned in many of these. Commercialization, consolidation and mechanization have forced a reduction in labour input as small operators have found it difficult to raise capital requirements or employ capital equipment to capacity. High levels of non-agricultural incomes and large non-farm population have also operated to provide attractive non-farm alternatives. These factors combined might be expected to produce relatively high levels of spatial relocation of the farm population.

The situation in the Prairie Provinces is somewhat similar to that in Ontario. Land resources are suitable for mechanization and specialization has been present since initial settlement. There are some exceptions to this pattern, particularly in the black soil areas where higher soil fertility initially induced smaller farm settlement patterns and less specialization. This is especially true in Manitoba but in these areas also consolidation is proceeding combined with increased mechanization. The entire area of the Prairies is dominated by commercialized agriculture which is responsive to market conditions. This past commercialization and specialization may mean a smaller population imbalance and lower levels of net population displacement in the 1956-61 period.

Unique land resources and topography have produced a rather unique pattern of adjustment in British Columbia. Land suitable for agriculture, occurring in relatively small pockets in river valleys and coastal plains, is particularly suited to specialized intensive crops such as fruits, vegetables and dairy farming, and tends to be high-priced. As a result, the pattern of agricultural development has been toward highly specialized small farms using extensive capital to maintain output per acre and per worker. In most cases, hired labour has been and is being replaced by machinery and farm size in some cases has been reduced to permit full operation by the owner alone. These circumstances may be expected to produce a relatively high level of spatial population relocation. Land is scarce and expensive, which discourages sub-marginal employment, while mechanization, essential to maintain returns to both land and labour, is replacing hired farm workers.

In each case, the net migration of the farm population is one part of the over-all pattern of agricultural change. As with other parts of the

process of agricultural adjustment, the migration flows observed arise from individual decisions based on a combination of factors, some of which tend to push people out of agriculture. Individual operators may find it impossible to raise the capital required for mechanization or to fully employ current types of capital equipment. Price levels of agricultural products may be too low to provide some operators with what they regard as an adequate return on their effort and investment. They may seek alternative employment. Hired labour may find that levels of remuneration in agriculture and the seasonal nature of employment do not provide adequate standards of living. Social services of education and recreation may not meet the desired standards of some rural farm residents. Any or all of these factors may tempt individual rural farm residents to look for alternative forms of employment or residence environment.

On the other hand, circumstances in other areas and occupations may provide pulling or attractive forces to individuals. Higher levels of remuneration and employment opportunity in non-farm occupations may induce movement of both farm operators and farm family members entering the labour force. Educational standards and the availability of other social services in non-farm areas may induce migration with or without occupational change. These conditions represent alternatives to rural farm life and farming as an occupation which may strongly influence individual decisions regarding residence and occupation.

The individual's decision to migrate is then based on his first-hand knowledge of his present situation, plus whatever information is available about circumstances in alternative destinations. Information may be available through mass communication media of radio, television and newspaper or may be received through social contacts with off-farm residents and previous migrants. This availability of information and the potential migrant's reaction to it may further depend on his present situation. Both levels of information and propensities to migrate are apt to depend on the educational achievement and age of the potential migrant as well as on his socio-cultural ties to his present location. It is not necessarily the poorest who migrate nor the wealthiest but rather a selection of individuals from all groups. This selection depends on information about attractive alternatives, the availability of resources to cover the monetary cost of relocation, and a willingness to accept the inherent risk and psychic cost involved.

The net effect of individual decisions is the pattern of migration flows presented in the next Section. These patterns arise in part from the agricultural change taking place and in part from the changes and circumstances in non-agricultural sectors of the economy. The third Section of this

Chapter compares the observed cross-sectional migration patterns to patterns of economic factors in order to examine the relationships that may exist.

6.2 PATTERNS OF RURAL FARM MIGRATION RATIOS, 1956-61

The purpose of this Section is to present and discuss, in light of the preceding discussion of social and economic conditions in agriculture, the observed migration flows of rural farm population in the 1956-61 period. It deals with flows out of rural farm residence in 1956 to non-farm residence in 1961, selected sex-age profiles of individual streams and, for the labour force population of 1961, selected characteristics such as educational levels and occupation at destination. Similar consideration is given to migrant flows into rural farm residence in 1961 from non-farm residence in 1956 and to net migration where possible. These flows illustrate part of the pattern of adjustment taking place within the economy in response to inter-sectoral differences in supply and demand for labour.

Migration estimates were derived directly from the Population Sample tabulations (see Chapter One, Sections 1.3 and 1.4, and Appendix B for relevant discussion). Among the various limitations of these data that might be mentioned here is the fact that the tabulations do not distinguish province of residence in 1956 of inter-provincial out-migrants from rural farm areas, necessitating consideration of these flows only in terms of province of residence in 1961.[4] Similarly for intra-provincial migrants, the data do not specify particular sub-provincial locations of residence in either 1956 or 1961.

Migration ratios have been used in preference to the actual number of migrants. Different base populations were used for calculating ratios of out-migration, in-migration and net migration in order to facilitate particular types of interpretation. The base for out-migration ratios is the 1956 farm population of the province or provinces of origin. The ratio is thus the proportion of the farm population at the beginning of the period that is living in non-farm residence in a particular province at the end of the period.[5] In-migration ratios to rural farm residence were calculated using the 1961 reporting farm population of the Population Sample. These ratios give an indication of the proportion of the 1961 farm population that moved into rural farm residence between 1956 and 1961 from rural non-farm and urban residence in 1956. The 'approximate exposed' population (that is, the 1961 farm population minus net migrants) was used for calculation of net migration ratios. In the case of rural farm migration, net migration is negative; thus the base population becomes the 1961 farm population plus the absolute net out-migration, giving a rough approximation of the number

of survivors of the 1956 rural farm population that could have migrated (see Chapter Two, footnote[6] for a related comment). The use of different base populations for calculating in-, out- and net migration ratios precludes precise comparison of magnitudes of in-, out- and net migration ratios.

6.2.1 PROVINCIAL VARIATION – In-migration ratios for the rural farm population are presented in Table 6.1. Intra-provincial ratios show movements taking place within the boundaries of each province. Inter-provincial ratios are presented by province of destination and show the movement of population into rural farm residence in the province of reference from rural non-farm and urban residence (as of 1956) in other provinces. The total in-migration ratios are the sums of the intra-provincial and inter-provincial ratios and thus show the size of the in-migrant population relative to the total rural farm population in 1961.

Table 6.1 – Internal In-Migration Ratios for Rural Farm Areas, Canada and Provinces, 1956-61

NOTE. — In-migration = $\frac{\text{number of in-migrants}}{\text{1961 rural farm population}} \times 100.$

Province[a]	Total[b]	Intra-provincial	Inter-provincial
Canada	**6.6**	**5.8**	**0.8**
Prince Edward Island	5.5	3.6	1.9
Nova Scotia	4.1	3.5	0.6
New Brunswick	3.4	2.6	0.8
Quebec	4.5	3.8	0.2
Ontario	9.4	9.0	0.4
Manitoba	5.7	4.4	1.2
Saskatchewan	4.9	3.8	1.1
Alberta	8.5	7.1	1.5
British Columbia	14.2	11.1	3.1

[a] Newfoundland not shown separately because of data inconsistencies.

[b] Total in-migration is intra-provincial in-migration plus inter-provincial in-migration.

SOURCE: 1961 Census, DBS 98-509, Tables I-2 and I-3.

There is considerable variation among provinces in the size of the in-migration ratios for both intra-provincial and inter-provincial migrant flows. British Columbia and Ontario have the highest ratios of in-migration to rural farm residence, with Alberta ranking third. This provincial ranking changes for inter-provincial ratios of in-migration to rural farm residence, with British Columbia, Prince Edward Island and the Prairie Provinces showing the highest ratios. The Canadian ratios of both intra-provincial and inter-provincial in-migration to rural farm residence are weighted[6] averages of the individual provincial ratios. Differentials between this Canadian ratio and the provincial ratios may then indicate differentials in

the attractiveness of rural farm residence in any one province relative to the Canadian average.

Similar variation appears among provincial ratios of total (inter-provincial plus intra-provincial) in-migration to rural farm residence, and the ranking of provinces in terms of magnitude of these ratios corresponds to that already noted for intra-provincial migration. British Columbia, Ontario and Alberta have the highest ratios of in-migration, all of which exceed the in-migration ratio for Canada as a whole. Ratios for the other provinces are less than that for Canada. On the basis of the previously mentioned relationship between the provincial and Canadian averages, the provincial rankings may indicate that the relative attractiveness of rural farm residence in British Columbia, Ontario and Alberta exceeds that for the nation as a whole.

Out-migration ratios for the rural farm population are presented in Table 6.2. It is important to note that the inter-provincial ratio does not refer to migration out of the province named in the relevant row of this table. The inter-provincial ratios deal with flows of migrants between provinces *in terms of province of destination,* and they may be regarded as ratios of in-migration to urban and rural non-farm residence in one province (that named in the relevant row of the table) from rural farm residence in all other provinces.

Examining out-migration ratios for intra-provincial rural farm migrants, there appears to be substantial variation among provinces. However, there is some similarity among provinces within the Maritime and Prairie regions. The Maritime Provinces have relatively high out-migration ratios particularly in Nova Scotia and New Brunswick. The position of Prince Edward Island is difficult to assess accurately but the small geographic size of the province, the relatively low level of urban development and the small size of Charlottetown relative to other Canadian urban centres may reduce substantially the *intra-provincial* shift from rural farm to other types of residence. It might be assumed that migration ratios are low in this province because a large part of rural farm outflow leaves the province. The flow out of the province cannot be estimated with the basic tabulations for the rural farm population.

In the Prairie Provinces, intra-provincial out-migration ratios are more uniform and somewhat lower than in most of the other provinces. This uniformity of migration ratios may be attributable in part to the rather similar patterns of agricultural organization and reorganization occurring in the three provinces. At the same time, the slightly lower out-migration ratio for Saskatchewan may result from differences in agricultural organization in that province relative to the other two. These factors are considered in more detail later.

Table 6.2 – Internal Out-Migration Ratios for Rural Farm Areas, Canada and Provinces, 1956-61

(Inter-provincial ratios shown by province of *destination*)

NOTE. — The base population used for intra-provincial out-migration ratios is the 1956 rural farm population of each province; the base used for inter-provincial out-migration ratios is the 1956 rural farm population in all provinces other than the province of destination. Migration ratios are calculated using the following formula: $\frac{\text{number of out-migrants}}{\text{1956 rural farm population}} \times 100$.

Province[a]	Total[b]	Intra-provincial	Inter-provincial[c]
Canada	**13.4**	**10.9**	**2.4**
Prince Edward Island	0.1	4.7	0.0
Nova Scotia	0.6	14.2	0.1
New Brunswick	0.6	10.4	0.2
Quebec	2.5	8.0	0.3
Ontario	3.6	12.2	0.9
Manitoba	0.9	8.3	0.2
Saskatchewan	1.3	7.9	0.2
Alberta	1.5	8.6	0.5
British Columbia	1.6	36.4	0.4

[a] Newfoundland not shown separately because of data inconsistencies.

[b] Intra-provincial plus inter-provincial, *both in terms of province of destination.* Total out-migration by province of destination thus shows total movement of farm population *into urban and rural non-farm residence in the province stated in the stub.* The base for each ratio is the 1956 rural farm population of Canada.

[c] The figures do *not* represent out-migration from the province stated in the stub of the table but indicate the size of flow *into non-farm residence in the province stated in the stub* from rural farm areas in *all other* provinces. The base for this in-migration ratio is the 1956 rural farm population of all provinces other than the province of reference.

SOURCE: 1961 Census, DBS 98-509, Tables I-2 and I-3.

The remaining regions (Quebec, Ontario and British Columbia) experienced rural farm out-migration ratios that vary markedly. In two cases, however, the ratios are similar to those of regions already discussed. The Quebec ratio of intra-provincial out-migration is similar to that of the Prairie Provinces despite the highly significant difference in socio-economic structure. Out-migration ratios in Ontario and the Maritime Provinces are also similar in magnitude but again with substantial difference in underlying structure. British Columbia stands by itself with an extremely high out-migration ratio, exceeding by a large margin that experienced in any of the other provinces.

The ratios of inter-provincial migration out of rural farm residence are presented according to province in which non-farm residence was established and may also be regarded as in-migration ratios to the province of reference from rural farm areas outside the province. Based on the 1956 rural farm population outside the province of destination, these ratios show the flows of inter-provincial rural farm out-migrants to alternative

destinations. The provincial variation in the size of these ratios gives an indication of the relative attractiveness to rural farm out-migrants of urban and rural non-farm residence in the alternative provinces of destination.

Distance is probably the most important factor explaining the sharp difference in magnitudes between intra-provincial and inter-provincial rural farm out-migration ratios. Increasing distance increases the monetary cost of migration and, more importantly, sharply increases the psychic cost of removal from family and social environment. The availability and accuracy of information about opportunities in various destinations may also decline rapidly with increasing distance. Longer distance migration thus involves both greater costs and increased risks which may reduce the willingness of individuals to move between provinces.

Variations by province in the size of migration ratios to non-farm residence from rural farm residence outside the province of reference show patterns that might be anticipated from general information on provincial socio-economic positions. Ontario has the highest ratio of rural farm migrants coming from outside the province, followed by Alberta and British Columbia. The Maritime Provinces and Saskatchewan have somewhat lower ratios, and Quebec assumes a middle position. These migration ratio patterns may indicate provincial variations in levels of economic opportunity, urban development, services and non-agricultural income. Both socio-economic and distance factors are relevant in the more detailed examination undertaken later.

Further indications of the relative attractiveness of non-farm residence in different provinces comes from the variation in the magnitude of total out-migration ratios by province of destination. Each of these ratios shows the percentage of the 1956 Canadian rural farm population living in non-farm residence in the province of reference in 1961. Provincial ranking in terms of the magnitude of this combined intra-provincial plus inter-provincial out-migration ratio differs from that found on the basis of either of the two component flows. This provides a third pattern of migration flows which, along with the inter-provincial and intra-provincial flows, will be compared to provincial patterns of income and opportunity measures.

Net migration ratios for the rural farm population are presented in Table 6.3. These ratios indicate provincial levels of rural farm population displacement due to intra-provincial migration. Estimates of inter-provincial and total net migration are not available from the basic tabulations. The data do not give either province of origin of inter-provincial out-migrants from rural farm residence or any indication of the number of migrants moving from rural farm residence to destinations outside Canada. Thus, while the total number of in-migrants to rural farm residence is available,

the total number of rural farm out-migrants from a given province cannot be estimated by a comparable method.

British Columbia, Nova Scotia and New Brunswick experienced the largest ratios (in absolute figures) of net displacement of the rural farm population as a result of intra-provincial migration. The ratios for these three provinces are two to three times as great (numerically) as those for the other provinces or for the rural farm population of Canada. In the two Maritime Provinces in particular, these high ratios of net migration are consistent with the previously discussed decline of agriculture in the Maritime region. In each provincial case, the net migration ratio illustrates the adjustment or population size in rural farm areas arising from individual decisions to move out of rural farm residence or into rural farm residence. These decisions in turn are based in part on information about present economic situation and economic opportunities available through migration.

Table 6.3 – Intra-Provincial Net Migration Ratios for Rural Farm Areas, Canada and Provinces, 1956-61

NOTE.—The base population for net migration ratios is the "exposed" population defined in Table 2.1, footnote[c]. The ratios are calculated using the formula:

$$\frac{\text{net migration}}{\text{exposed population}} \times 100.$$

Province[a]	Net migration ratio
Canada	- 9.2
Prince Edward Island	- 3.0
Nova Scotia	- 19.1
New Brunswick	- 17.6
Quebec	- 7.6
Ontario	- 7.6
Manitoba	- 6.4
Saskatchewan	- 6.5
Alberta	- 4.3
British Columbia	- 28.6

[a] Newfoundland not shown separately because of data inconsistencies.

SOURCE: 1961 Census, DBS 98-509, Table I-2.

Tables 6.1, 6.2 and 6.3 have presented the levels and provincial variations in migration ratios for the rural farm population aged five and over in 1961. In order to examine in more detail the characteristics of the migrants in these flows, a selection of provincial flows has been used. This selection is based in part on the regional uniformity observed and in part on the desire to examine the characteristics of migrants moving out of rural farm areas and into non-farm areas in differing economic and social situations. New Brunswick, Ontario, Saskatchewan and British

Columbia provide considerable variety in both farm and non-farm economic and social situations, and the flows within Canada as a whole provide a norm for purposes of comparison.

6.2.2 SEX-AGE SELECTIVITY – Table 6.4 presents in-migration ratios for the rural farm population by sex and age in the selected provinces and Canada. The 1961 reporting rural farm population was used as a base for both intra-provincial and inter-provincial in-migration ratios. The age groups used for Canada are much narrower than those used at the provincial level, the latter being 20-34 and 35 and over.

Table 6.4 – Internal In-Migration Ratios for Rural Farm Areas, by Sex and Age, Canada and Selected Provinces, 1956-61

(Ratios per 100 rural farm population by sex in identical age groups)

Province and age group	Intra-provincial in-migration			Inter-provincial in-migration		
	Total	Male	Female	Total	Male	Female
Canada	**5.8**	**5.5**	**6.1**	**0.8**	**0.8**	**0.8**
5-14 years	5.3	5.6	5.1	0.7	0.7	0.6
15-19 years	5.0	5.0	5.0	0.6	0.7	0.6
20-24 years	11.1	6.9	17.7	1.6	1.3	2.0
25-29 years	13.0	10.7	15.6	2.2	2.1	2.3
30-34 years	9.3	9.2	9.3	1.4	1.6	1.2
35-44 years	5.9	6.2	5.5	0.8	0.9	0.7
45-64 years	3.6	3.8	3.4	0.5	0.5	0.5
65 years and over	3.4	3.2	3.8	0.5	0.3	0.6
20-34 years	11.0	8.7	13.9	1.7	1.7	1.8
35 years and over	4.3	4.4	4.2	0.6	0.6	0.6
New Brunswick	2.6	2.4	2.8	0.8	1.0	0.7
20-34 years	6.4	4.4	8.7	1.6	1.6	1.8
35 years and over	1.9	2.1	1.7	0.6	0.8	0.5
Ontario	9.0	8.8	9.3	0.4	0.4	0.4
20-34 years	17.0	13.8	20.9	0.9	1.0	0.9
35 years and over	6.4	6.6	6.2	0.3	0.3	0.3
Saskatchewan	3.8	3.5	4.1	1.1	1.0	1.1
20-34 years	8.6	6.4	11.4	2.7	2.7	2.8
35 years and over	2.4	2.5	2.2	0.6	0.6	0.7
British Columbia	11.1	10.8	11.5	3.1	3.2	2.9
20-34 years	17.8	16.4	19.6	4.3	4.1	4.5
35 years and over	9.1	9.1	9.2	2.5	2.4	2.6

SOURCE: 1961 Census, DBS 98-509, Tables I-2 and I-3.

The migration ratios in Table 6.4 demonstrate the sex-age selectivity of intra-provincial and inter-provincial in-migration to rural farm residence

and the difference in this selectivity between the two types of movement. In the 20-34 age group, females have higher in-migration ratios than males in both intra-provincial and inter-provincial migration streams. Females also have higher migration ratios than males when all males and females five years of age and over are considered, but lower migration ratios than males in the over-65 age group. This pattern of differences among migration ratios occurs in both intra-provincial and inter-provincial migration streams but the size of the difference by sex is much less in the latter stream.

The age selectivity of in-migration is illustrated by the difference in the size of migration ratios between the age groups 20-34 and 35 and over. The younger age group has migration ratios that are more than twice as large as those for the older age group. This difference occurs in both intra-provincial and inter-provincial migration streams but is larger for inter-provincial streams. Thus, in 1961, the generally shorter-distance intra-provincial in-migration had a greater concentration of females than inter-provincial in-migration but the latter had a greater concentration of migrants aged 20-34.

The sex-age selectivity of out-migration from rural farm residence is illustrated by the differences in out-migration ratios by sex and age presented in Table 6.5. The patterns of difference by sex and age in out-migration ratios are similar to those already described for in-migration ratios. Females have higher out-migration ratios than males, particularly in intra-provincial out-migration. Migrants aged 20-34 have higher out-migration ratios than either those aged 35 and over or the total population aged five and over in 1961. These differences among age-specific out-migration ratios are greater in inter-provincial out-migration than in intra-provincial out-migration.

The difference in magnitude and sex-age selectivity between intra-provincial and inter-provincial migration ratios (both into and out of rural farm residence) demonstrates the effects of increased distance. Inter-provincial migration flows are more concentrated in the young age groups than intra-provincial migration, judging from the differentials between the ratios for age group 20-34 and those for age group 35 and over. In response to the increase of risk-cost factors with increase of migration distance (see Section 6.2.1 for relevant comments), the inter-provincial in- and out-migration streams tend to be composed mainly of young migrants to whom family-social ties are perhaps least and opportunity relatively great considering their flexibility and amenability to the acquisition of new occupational skills. The smaller magnitude of inter-provincial than intra-provincial migration ratios indicates the smaller number of migrants prepared to accept the greater risks and costs of longer-distance migration.

Table 6.5 – Internal Out-Migration Ratios for Rural Farm Areas, by Sex and Age, Canada and Selected Provinces, 1956-61

(Inter-provincial ratios shown by province of *destination*)

NOTE.—The base used for calculating ratios is the 1956 rural farm population in age groups five years younger — e.g., the base for out-migration ratio for age 15-19 in 1961 is 1956 rural farm population aged 10-14. The base for intra-provincial out-migration is the rural farm population of province of reference. The base for inter-provincial out-migration is the rural farm population outside the province of reference.

Province and age group	Intra-provincial out-migration			Inter-provincial out-migration[a]		
	Total	Male	Female	Total	Male	Female
Canada	**10.9**	**10.2**	**11.8**	**2.4**	**2.4**	**2.5**
5-14 years	11.9	11.9	11.9	2.9	3.0	2.8
15-19 years	9.0	7.2	11.0	1.5	1.3	1.7
20-24 years	14.2	10.7	18.2	3.0	2.8	3.2
25-29 years	18.5	16.7	21.0	4.6	4.5	4.8
30-34 years	17.6	17.7	17.6	4.8	4.9	4.8
35-44 years	12.6	13.0	12.2	3.4	3.6	3.1
45-64 years	7.3	7.1	7.5	1.1	1.1	1.1
65 years and over	5.1	4.4	6.0	0.7	0.7	0.8
20-34 years	16.3	14.3	18.8	3.9	3.8	4.1
35 years and over	8.2	7.9	8.6	1.7	1.7	1.7
New Brunswick	10.4	9.4	11.4	0.2	0.1	0.2
20-34 years	15.4	12.9	18.3	0.2	0.2	0.3
35 years and over	7.2	7.1	7.2	0.1	0.1	0.1
Ontario	12.2	11.6	12.9	0.9	0.9	0.9
20-34 years	18.7	16.9	21.0	1.5	1.5	1.5
35 years and over	8.5	8.3	8.6	0.6	0.6	0.6
Saskatchewan.............	7.9	7.1	8.8	0.2	0.2	0.2
20-34 years	11.8	9.9	14.2	0.3	0.3	0.3
35 years and over	6.1	5.6	6.7	0.1	0.1	0.1
British Columbia	36.4	35.8	37.0	0.4	0.3	0.4
20-34 years	54.4	51.3	58.1	0.5	0.4	0.5
35 years and over	27.6	28.3	26.8	0.3	0.3	0.3

[a] This may be regarded as in-migration to urban and rural non-farm residence in province of residence from rural farm areas outside the province. See Table 6.2, footnote[c] for further comment.

SOURCE: 1961 Census, DBS 98-509, Tables I-2 and I-3.

Intra-provincial net migration ratios for rural farm females exceed in absolute value those for males. Net migration ratios for the rural farm population aged 20-34 in 1961 exceed (in absolute value) those for the population aged 35 and over in 1961. These sex-age differences in the net migration ratios are presented in Table 6.6.

Table 6.6 – Intra-provincial Net Migration Ratios for Rural Farm Areas, by Sex and Age, Canada and Selected Provinces, 1956-61

NOTE. — The base population used in calculating net migration ratios by age is the "exposed" population in age groups corresponding to those of the migrant population (see Table 2.1, footnote[c]).

Province and age group	Total	Male	Female
Canada	– 9.2	– 8.3	– 10.2
5-14 years	– 9.0	– 8.8	– 9.3
15-19 years	– 7.7	– 4.6	– 11.4
20-24 years	– 17.6	– 13.1	– 23.8
25-29 years	– 16.3	– 17.1	– 15.4
30-34 years	– 13.1	– 13.8	– 12.2
35-44 years	– 9.1	– 9.2	– 9.0
45-64 years	– 5.8	– 5.2	– 6.7
65 years and over	– 6.5	– 5.3	– 8.1
20-34 years	– 15.7	– 14.5	– 17.1
35 years and over	– 7.0	– 6.5	– 7.7
New Brunswick	– 17.6	– 16.1	– 19.3
20-34 years	– 31.5	– 28.4	– 34.9
35 years and over	– 11.8	– 11.4	– 12.3
Ontario	– 7.6	– 6.9	– 8.5
20-34 years	– 13.1	– 12.1	– 13.0
35 years and over	– 5.2	– 4.8	– 5.8
Saskatchewan	– 6.5	– 5.7	– 7.4
20-34 years	– 9.3	– 8.7	– 10.0
35 years and over	– 5.5	– 4.7	– 6.5
British Columbia	– 28.6	– 28.1	– 29.2
20-34 years	– 44.9	– 43.6	– 46.3
35 years and over	– 22.9	– 23.4	– 22.2

SOURCE: 1961 Census, DBS 98-509, Tables I-2 and I-3.

6.2.3 EDUCATIONAL AND OCCUPATIONAL SELECTIVITY – In order to consider other characteristics of the migrant population to and from rural farm residence, Tables 6.7 and 6.8 concentrate on the labour force part of these migrant populations. This use of labour force leads to difficulties in interpreting the migration ratios since migrants can enter or leave the labour force during the migration interval. Migrants who were not in the labour force in 1956 may have been in the labour force in 1961, or *vice versa*, and the relationship of labour force migrants in 1961 to labour force in 1956 is not definite. The tables consider distributions of labour force migrants in 1961 among occupation groups, education levels and urban size groups. These distributions for migrants are compared with distributions for the total population at the same point in time.

The educational distributions and patterns illustrate another aspect of the selectivity of migration in addition to that already observed with respect to age. Rural farm migrants tend to be more heavily concentrated at higher schooling levels than the whole rural farm population. Both age and educational selectivities appear to increase with greater migration distance, as the intra-provincial and inter-provincial flows demonstrate (Table 6.7).

Intra-provincial male out-migrants from farms show a schooling distribution weighted more heavily among the lower levels of achievement than that of the 1961 non-farm labour force; only 57 per cent of these male out-migrants from rural farm areas have more than elementary-level schooling, compared with 59 per cent of the non-farm labour force. The per cent of the out-migrants from rural farm areas with more than high school is slightly lower than that of the non-farm labour force, although both figures are practically 10 per cent. Comparing the same schooling distribution for rural farm out-migrants with that of the 1961 rural farm labour force, the latter shows significantly heavier concentration at lower schooling levels. Only 34 per cent of the rural farm labour force have more than elementary school education and only two per cent have more than high school.

Table 6.7 – Percentage Distribution by Schooling of Migrants in the Labour Force and of Total Labour Force, Canada, 1961

Sex and schooling	Reporting population, 1961 by type of residence		In-migrants to rural farm residence by type of movement		Out-migrants from rural farm residence by type of movement	
	Urban and rural non-farm	Rural farm	Intra-provincial migrants	Inter-provincial migrants	Intra-provincial migrants	Inter-provincial migrants
Male	100.0[a]	100.0[a]	100.0	100.0	100.0	100.0
Elementary or less	41.3	66.1	59.8	57.1	43.2	28.5
Secondary	48.6	32.0	37.2	39.3	47.2	57.1
University	10.0	2.0	3.0	3.6	9.6	14.4
Female	100.0[a]	100.0	100.0	100.0	100.0	100.0
Elementary or less	28.7	49.2	41.2	40.5	26.0	20.2
Secondary	63.9	46.0	53.6	49.3	65.1	69.2
University	7.5	4.8	5.2	10.2	8.9	10.6

[a] Percentages do not add to the total due to rounding error.

SOURCE: Same as Table 2.5.

Inter-provincial male out-migrants from rural farm residence are more heavily concentrated in higher schooling groups than either the non-farm

population (at destination) or the rural farm population. These inter-provincial migrants also have a schooling distribution weighted more heavily among higher levels of achievement than the distribution for intra-provincial out-migrants. Some 72 per cent of inter-provincial male out-migrants from rural farm areas have more than elementary school education compared with 59 per cent of the 1961 non-farm labour force, 34 per cent of the rural farm labour force, and 57 per cent of intra-provincial male out-migrants.

Intra-provincial male in-migrants to rural farm residence appear to have higher schooling levels than the 1961 rural farm population but lower levels than the non-farm population. Schooling levels among these in-migrants are lower than levels among intra-provincial male out-migrants and inter-provincial male in-migrants. Only 40 per cent of intra-provincial male in-migrants to rural farm areas have more than elementary school education.

This pattern of differences in educational distribution among male migrants by type of movement, rural farm labour force and non-farm labour force also exists for females. Intra-provincial female out-migrants from rural farm areas are more heavily concentrated at higher schooling levels than either female in-migrants or female rural farm labour force. Intra-provincial female out-migrants are also more heavily concentrated at these higher schooling levels than the non-farm labour force and either type of male out-migrant. As with male migrants, inter-provincial female migrants, either into or out of rural farm residence, have higher schooling levels than intra-provincial female migrants.

The explanation for both the age and educational patterns of selectivity may conceivably rest on variations in opportunity factors and risk-cost factors among age groups and education levels. Both younger age and higher levels of schooling would tend to make migrants more flexible and amenable to acquiring whatever skills might be necessary for employment at destination. This should increase the potential number of opportunities available to these migrants and reduce the risks inherent in relocation. At the same time, higher levels of schooling may provide potential migrants with first-hand knowledge of opportunities available through relocation, or at least familiarize them with sources from which such information can be obtained. In fact, acquiring an education beyond the elementary school level may itself have involved some degree of spatial mobility, reducing the family-neighbourhood ties which contribute heavily to the psychic costs of migration. This younger more highly educated sector of the population may find migration more attractive than the remainder of the population. Their employment opportunities are greatest, risk is lowest, information is greatest and cost factors, both monetary and non-monetary, may be least.

In addition to providing sex-age and schooling characteristics of rural farm migrants, the Population Sample data also permit estimation of the 1961 occupational distribution of out-migrants from rural-farm areas. The socio-economic situation of agriculture tends to create a potential supply of migrants or a population greater than agricultural activity can absorb. A part of this rural farm population responds to the situation in agriculture and the situation or level of opportunity in non-agricultural areas by moving from farm to non-farm residence. Age, sex and schooling levels in the rural farm population may operate to determine the size and composition of the population responding. The distribution of this migrant population among occupations at destination illustrates the relative importance of different occupations in absorbing this supply of population.

Differences between the 1961 occupational distributions of rural farm out-migrants and non-farm labour force illustrate different patterns of migrant occupational selectivity[7] by sex and type of movement. Inter-provincial male out-migrants from rural farm areas appear to be more selective in their choice of occupation than intra-provincial male out-migrants. For female out-migrants from rural farm areas, the opposite pattern of occupational selectivity by type of movement appears. Intra-provincial female out-migrants appear to be more selective in their choice of occupation than inter-provincial female out-migrants. The occupations in which migrants are more heavily concentrated than the non-farm labour force are different for intra-provincial and inter-provincial rural farm out-migrants.

In Canada, the occupational distribution of male intra-provincial rural farm out-migrants differs only slightly from that of the male labour force residing in non-farm areas. The small magnitudes of differences between percentage distribution by occupation for intra-provincial out-migrants from farm areas and for the non-farm area labour force indicate a relatively low level of migrant occupational selectivity. In the transportation, farm, other primary, craftsmen and labourer occupation groups, the intra-provincial out-migrants do show slightly greater concentrations than the receiving-area non-farm labour force. These differences in occupational distribution, which do appear, show intra-provincial rural farm out-migrants more heavily concentrated in 'blue-collar' occupations than the non-farm area labour force.

Inter-provincial male out-migrants from rural farm areas are more heavily concentrated in the professional, technical, service and recreation occupations than the non-farm area male labour force. This pattern of differences for both intra-provincial and inter-provincial male rural farm out-migrants is observed in varying degrees among the provinces.

Table 6.8 – Percentage Distribution[a] by Major Occupation Division of the Reporting Labour Force Migrating from Rural Farm to Non-farm Areas, Canada and Selected Provinces, 1956-61

No.	Occupation division	Male				
		Reporting population	Intra-provincial migrants	B - A	Inter-provincial migrants	D - A
		A	B	C	D	E
	Canada					
1	All occupations	100.0	100.0	—	100.0	—
2	Managerial	11.9	8.5	- 3.4	7.5	- 4.4
3	Professional and technical	8.5	10.0	1.5	11.6	3.1
4	Clerical	8.1	6.4	- 1.7	6.1	- 2.0
5	Sales	6.6	5.1	- 1.5	4.4	- 2.2
6	Service and recreation	8.5	8.2	- 0.3	25.9	17.4
7	Personal service	—	—	—	—	—
8	Transport and communication	8.6	9.6	1.0	6.8	- 1.8
9	Farmers and farm workers	2 6	2.7	0.1	2.0	- 0.6
10	Other primary occupations	3.8	7.5	3.7	5.2	1.4
11	Craftsmen, production process and related workers	33.0	33.5	0.5	23.1	- 9.9
12	Labourers, not elsewhere classified	6.7	7.4	0.7	6.2	- 0.5
13	Occupation not stated	1.7	1.2	- 0.5	1.0	- 0.7
	New Brunswick					
14	All occupations	100.0	100.0	—	100.0	—
15	Managerial	10.3	7.0	- 3.3	5.1	- 5.2
16	Professional and technical	6.2	9.4	3.2	11.2	5.0
17	Clerical	6.5	6.6	0.1	1.3	- 5.2
18	Sales	5.4	5.4	0.0	2.4	- 3.0
19	Service and recreation	9.2	8.5	- 0.7	44.7	35.5
20	Personal service	—	—	—	—	—
21	Transport and communication	9.7	10.4	0.7	6.6	- 3.1
22	Farmers and farm workers	2.8	3.0	0.2	1.9	- 0.9
23	Other primary occupations	10.8	11.0	0.2	1.9	- 8.9
24	Craftsmen, production process and related workers	29.3	29.5	0.2	15.7	- 13.6
25	Labourers, not elsewhere classified	8.7	8.4	- 0.3	7.1	- 1.6
26	Occupation not stated	1.2	0.9	- 0.3	1.9	0.7
	Ontario					
27	All occupations	100.0	100.0	—	100.0	—
28	Managerial	12.2	8.5	- 3.7	5.9	- 6.3
29	Professional and technical	9.3	9.6	0.3	12.5	3.2
30	Clerical	8.5	6.0	- 2.5	6.4	- 2.1
31	Sales	6.7	5.3	- 1.4	3.2	- 3.5
32	Service and recreation	8.4	9.2	0.8	27.0	18.6
33	Personal service	—	—	—	—	—

For footnote, see end of table.

Table 6.8 – Percentage Distribution[a] by Major Occupation Division of the Reporting Labour Force Migrating from Rural Farm to Non-farm Areas, Canada and Selected Provinces, 1956-61

Female					
Reporting population	Intra-provincial migrants	G-F	Inter-provincial migrants	I-F	
F	G	H	I	J	No.
100.0	100.0	–	100.0	–	1
16.9	24.6	7.7	20.5	3.6	2
					3
32.6	23.4	– 9.2	31.2	– 1.4	4
9.5	8.8	– 0.7	8.4	– 1.1	5
0.4	0.2	– 0.2	0.6	0.2	6
22.1	30.4	8.3	28.9	6.8	7
					8
					9
					10
17.1	11.7	– 5.4	9.6	– 7.5	11
					12
1.5	0.9	– 0.6	0.8	– 0.7	13
100.0	100.0	–	100.0	–	14
22.3	27.3	5.0	11.8	– 10.5	15
					16
26.7	25.9	– 0.8	25.9	– 0.8	17
10.9	6.8	– 4.1	16.5	5.6	18
0.2	–	– 0.2	–	– 0.2	19
25.6	34.3	8.7	34.4	8.8	20
					21
					22
					23
13.2	5.2	– 8.0	11.3	– 1.9	24
					25
1.1	0.4	– 0.7	–	– 1.1	26
100.0	100.0	–	100.0	–	27
15.4	20.5	5.1	17.0	1.6	28
					29
35.5	27.6	– 7.9	32.7	– 2.8	30
9.1	8.9	– 0.2	5.2	– 3.9	31
0.4	0.2	– 0.2	–	– 0.4	32
21.1	27.1	6.0	29.9	8.8	33

Table 6.8 – Percentage Distribution[a] by Major Occupation Division of the Reporting Labour Force Migrating from Rural Farm to Non-farm Areas, Canada and Selected Provinces, 1956-61 – concluded

No.	Occupation division	Male				
		Reporting population	Intra-provincial migrants	B - A	Inter-provincial migrants	D - A
		A	B	C	D	E
	Ontario – concluded					
1	Transport and communication	7.8	9.7	1.9	5.5	– 2.3
2	Farmers and farm workers ..	2.1	2.8	0.7	2.0	– 0.1
3	Other primary occupations ..	2.2	5.4	3.2	6.4	4.2
4	Craftsmen, production process and related workers ..	34.5	34.4	– 0.1	22.2	– 12.3
5	Labourers, not elsewhere classified	6.4	7.5	1.1	7.5	1.1
6	Occupations not stated	1.9	1.6	– 0.3	1.4	– 0.5
	Saskatchewan					
7	All occupations	100.0	100.0	–	100.0	–
8	Managerial	14.2	11.5	– 2.7	9.5	– 4.7
9	Professional and technical..	8.7	14.7	6.0	11.4	2.7
10	Clerical	7.0	8.4	1.4	10.3	3.3
11	Sales	7.1	6.6	– 0.5	3.5	– 3.6
12	Service and recreation	7.4	5.7	– 1.7	17.5	10.1
13	Personal service	–	–	–	–	–
14	Transport and communication	8.5	6.6	– 1.9	7.6	– 0.9
15	Farmers and farm workers ..	12.3	5.3	– 7.0	2.4	– 9.9
16	Other primary occupations ..	2.1	2.2	0.1	6.5	4.4
17	Craftsmen, production process and related workers ..	25.7	32.1	6.4	25.9	0.2
18	Labourers, not elsewhere classified	5.4	5.6	0.2	4.9	– 0.5
19	Occupation not stated	1.6	1.2	– 0.4	0.7	– 0.9
	British Columbia					
20	All occupations	100.0	100.0	–	100.0	–
21	Managerial	12.8	9.6	– 3.2	9.6	– 3.2
22	Professional and technical..	8.4	7.4	– 1.0	8.5	0.1
23	Clerical	6.3	4.0	– 2.3	4.1	– 2.2
24	Sales	6.8	4.1	– 2.7	6.1	– 0.7
25	Service and recreation	8.8	6.9	– 1.9	20.1	11.3
26	Personal service	–	–	–	–	–
27	Transport and communication	8.7	9.6	0.9	6.4	– 2.3
28	Farmers and farm workers ..	2.2	2.3	0.1	2.2	0.0
29	Other primary occupations ..	5.0	12.5	7.5	4.3	– 0.7
30	Craftsmen, production process and related workers ..	32.6	36.4	3.8	31.8	– 0.8
31	Labourers, not elsewhere classified	6.4	6.4	0.0	5.7	– 0.7
32	Occupation not stated	1.9	0.7	– 1.2	1.2	– 0.7

[a] Percentages may not add to totals due to rounding error.

SOURCE: Same as Table 2.5.

Table 6.8 – Percentage Distribution[a] by Major Occupation Division of the Reporting Labour Force Migrating from Rural Farm to Non-farm Areas, Canada and Selected Provinces, 1956-61 – concluded

Female					
Reporting population	Intra-provincial migrants	G - F	Inter-provincial migrants	I - F	
F	G	H	I	J	No.
17.4	15.0	– 2.4	13.7	– 3.7	1, 2, 3, 4, 5
1.2	0.7	– 0.5	1.5	0.3	6
100.0	100.0	–	100.0	–	7
22.0	31.8	9.8	25.1	3.1	8, 9
28.4	22.9	– 5.5	20.0	– 8.4	10
11.8	9.6	– 2.2	19.2	7.4	11
0.3	0.3	0.0	–	– 0.3	12
27.5	28.7	1.2	31.8	4.3	13
8.3	5.7	– 2.6	3.9	– 4.4	14, 15, 16, 17, 18
1.6	1.0	– 0.6	–	– 1.6	19
100.0	100.0	–	100.0	–	20
18.7	21.5	2.8	23.4	4.7	21, 22
34.3	27.0	– 7.3	30.3	– 4.0	23
11.2	10.4	– 0.8	11.7	0.5	24
0.5	0.5	0.0	0.6	0.1	25
23.2	32.6	9.4	25.2	2.0	26
10.2	7.2	– 3.0	8.2	– 2.0	27, 28, 29, 30, 31
1.9	0.8	– 1.1	0.6	– 1.3	32

Both intra-provincial and inter-provincial female out-migrants from rural farm areas are more heavily concentrated in professional and personal service occupations than the female non-farm area labour force. The magnitude of difference in occupational distribution between rural farm out-migrants and the receiving-area labour force is greater for intra-provincial than for inter-provincial out-migrants. In contrast to male out-migrants, intra-provincial female out-migrants appear to be more selective in their choice of occupation than inter-provincial female out-migrants. Again, this pattern of differences for female rural farm out-migrants tends to be observed in varying degrees among the provinces but there is more variation for females than for males.

The different patterns of occupational distribution among intra-provincial and inter-provincial rural farm out-migrants (by sex) might be anticipated from differing characteristics among these migrant streams. Intra-provincial male rural farm out-migrants have lower levels of schooling than either the non-farm labour force (at destination) or the inter-provincial rural farm out-migrants. These lower levels of schooling may reduce opportunities for intra-provincial out-migrants to enter 'white-collar' occupations. In contrast, inter-provincial rural farm out-migrants have higher levels of schooling than the non-farm labour force, and greater concentration in the 20-34 age group than intra-provincial out-migrants. Both age and schooling characteristics may increase white-collar occupation opportunities for inter-provincial migrants. Schooling levels among female out-migrants, which are generally higher than those for male out-migrants, may explain the concentration of female out-migrant in professional and service occupations. In all cases, the age-schooling characteristics of migrants may be expected to affect the ease with which they can enter different occupation groups.

Just as characteristics such as age and schooling affect the adaptability of migrants to occupational opportunities, the type of residence to which migrants move may determine the range of opportunities available. Large urban centres may offer increased opportunities in service and professional occupations. Opportunities in logging, mining and fishing, the primary occupations other than agriculture, may be greater in small urban centres and rural non-farm areas. Thus, the distribution of rural farm out-migrants by type of non-farm residence may be related to the occupations into which these migrants move.

As might be anticipated from the differences in occupational distribution previously discussed, inter-provincial rural farm out-migrants show a higher concentration toward urban residence than intra-provincial out-migrants (Table 6.9). The greatest part of this urban concentration of inter-provincial out-migrants is in urban centres of 100,000 population and

over. Intra-provincial migrants show roughly similar concentration in urban centres of 100,000 population and over and urban centres with population less than 10,000. This distribution by type of non-farm residence and the differences between the intra-provincial and inter-provincial migrant distributions by non-farm residence type may be associated with differences in occupational distribution between intra-provincial and inter-provincial rural farm out-migrants.

Table 6.9 – Percentage Distribution of Out-Migrants from Rural Farm Areas, by Urban Size Group and Rural Non-farm, Canada, 1956-61

Residence 1961	Intra-provincial migrants	Inter-provincial migrants
All non-farm	100.0	100.0
Urban	58.6	67.0
100,000 and over	22.7	36.8
30,000-99,999	8.7	6.9
10,000-29,999	7.1	8.4
Under 10,000	20.1	14.9
Rural non-farm	41.4	33.0

SOURCE: Same as Table 2.5.

The migration ratios and distributions of migrants by schooling, occupation and non-farm residence type illustrate the general patterns and characteristics of rural farm population migration. The next Section will examine patterns of association between these migration flows and differentials in measures of income and economic opportunity.

6.3 ECONOMIC CORRELATES OF THE RURAL FARM MIGRATION PATTERNS

The purpose of this Section is to examine the 1956-61 rural farm migration pattern in detail, which the limitations of previous censuses have not permitted. The rural farm migration patterns discussed in the previous Section are associated with various measures of income and economic opportunity.

If rural-farm migration is in part a response to differentials in economic change among sectors and spatial units within the economy, comparisons of cross-sectional migration patterns with those in economic factors may yield some insight into their relationship. In the case of rural farm

migration in the 1956-61 period, provincial differences in migration ratios may arise from provincial differences in income and economic opportunity. These economic differences among provinces indicate variations among provinces in economic growth and structural change, which in turn may be related to changing patterns of aggregate demand in the economy.

The indicators of income benefit and economic opportunity used here have demonstrated fairly strong relationships to rural farm net migration in other studies (cf. Daly, 1955; Szabo, 1965; Szabo, 1966; and Minami, 1967). In Japan, for example, changes over time in the size of rural farm net migration ratios appear to be related to changes in the levels of both farm and non-farm per capita income (Minami, 1967). The level of non-farm per capita income relative to farm per capita income and temporal changes in this relative level also appear to influence the level of rural farm net migration. For the Canadian rural farm migration patterns observed here, provincial variations in per capita non-farm and farm income are compared with such variations in rural farm migration ratios.[8] The ratio of per capita non-farm to per capita farm income is also considered.

Income differences may be viewed as measures of benefit available through migration, assuming that employment opportunity exists. For purposes of the present analysis it is assumed that income levels, and variations in these levels among provinces, are indicative of both monetary and non-monetary benefit. For non-farm incomes in particular, variations in per capita income levels among provinces may correspond to variations in levels of urban and social services, as well as to differing levels of monetary benefit. From this point of view, income levels may provide attractions to migrants in both monetary and non-monetary senses.

In order to acquire the monetary benefits indicated by income levels, employment opportunity must exist for the migrant in the potential destination. Again, the indicators of employment opportunity used here show relationships to net migration in other studies. In the United States, 'service income' per worker has been used as an indicator of opportunity.[9] Spatial and temporal variations in service income per worker have appeared to be closely related to such variations in migration ratios. For the purposes of examining the association between rural farm migration and economic opportunity levels in Canada for the 1956-61 period, provincial variations in rural farm migration and in non-agricultural service income per worker are compared.

In Japan, the rate of growth of gross domestic product has been used as an indicator of economic opportunity (Minami, 1967). A measure comparable to gross domestic product is not available at the provincial level in Canada for the 1956-61 period. The use of total non-agricultural wages

and salaries, however, does give some indication of both growth in employment and changes in productivity. If it can be assumed that productivity change through technological advance affects wages and salaries to approximately equal extents in all provinces, differences among provinces in the rate of growth of total non-agricultural wages and salaries give some indication of differing provincial levels of non-farm employment opportunities. To examine the relationship between 1956-61 rural farm migration and economic opportunity, provincial variations in rate of growth of non-agricultural wages and salaries are compared with those in rural farm migration ratios.

The 1961 occupational distribution of rural farm out-migrants in the 1956-61 period gives some indication of the occupational patterns of absorption of these migrants into non-farm activity. These patterns of absorption may depend in part on the sex-age and educational characteristics of the rural farm out-migrants and in part on the differences in employment opportunity among occupations. In the 1956-61 period, an estimate of variations in employment opportunity by occupation may be available from the rate of growth of employment by occupation, excluding the part of that growth attributable to the rural farm migrants themselves. Different rates of growth by occupation are compared with migrant and receiving-area occupational distributions, so as to examine the association between migrant absorption by occupation and employment opportunity by occupation. The various comparisons mentioned above are made for intra-provincial and inter-provincial migrants separately.

6.3.1 INTRA-PROVINCIAL RURAL FARM MIGRATION AND PROVINCIAL INCOME LEVELS – The intra-provincial rural farm migration ratios previously presented in Tables 6.1, 6.2 and 6.3 were associated with provincial levels of income measures. Intra-provincial rural farm in-migration ratios were associated with provincial levels of per capita agricultural income. Intra-provincial rural farm out-migration ratios were associated with provincial levels of per capita non-agricultural income, of per capita agricultural income and of the ratio of the per capita non-agricultural to agricultural income. Net migration ratios for intra-provincial rural farm migrants were associated with the same income factors as out-migration ratios. The patterns of association that emerge should assist in the formulation of hypothetical relationships between the 1956-61 intra-provincial rural farm migration and provincial levels of agricultural and non-agricultural income.

It might be hypothesized that intra-provincial in-migration ratios to rural farm residence vary directly with provincial levels of per capita agricultural income. In-migration to rural farm residence involves to some extent the adoption of farming as an occupation and participation in rural farm society. Per capita levels of agricultural income may indicate both

levels of monetary return in the farming occupations and the level of services available in rural farm society. Thus, higher levels of monetary and non-monetary returns might be expected to produce higher in-migration ratios. The selected data are consistent with this hypothesis.[10]

Intra-provincial in-migration ratios to rural farm residence are on the average highest in the three provinces with the highest levels of per capita agricultural income and lowest in the three provinces with the lowest levels of per capita agricultural income. The remaining provinces, with per capita agricultural income levels of intermediate magnitude, have intra-provincial in-migration ratios to rural farm residence which on average exceed those for the lowest income provinces but are smaller than those for the highest income provinces (Table 6.10).

Table 6.10 – Average Intra-Provincial Rural Farm In-Migration Ratios and Levels of Per Capita Agricultural Income for Three Groups of Provinces, 1956 and 1961

NOTE.—Averages for both per capita income and migration ratios are unweighted arithmetic means of respective provincial values in each group. The 'high income' provinces are Alberta, British Columbia and Saskatchewan; the 'middle income' provinces are Manitoba, Ontario and Quebec; and the 'low income' provinces are New Brunswick, Nova Scotia and Prince Edward Island.

Income and year	High-income provinces		Middle-income provinces		Low-income provinces	
	Average income	Average migration ratio	Average income	Average migration ratio	Average income	Average migration ratio
	$		$		$	
Per capita agricultural income —						
1956	781	7.2	462	5.6	246	3.3
1961	896	7.2	579	5.7	224	3.2

SOURCE: In-migration ratios calculated from data presented in Table 6.1; income data calculated from income estimates in Appendix Table A.3.

Patterns of variation in intra-provincial rural farm out-migration and in provincial per capita incomes do not show similarities that would tend to support any of the anticipated relationships (Table 6.11). The size of intra-provincial rural farm out-migration ratios might be expected to vary directly with provincial levels of per capita non-agricultural income. As in the case of in-migration to rural farm residence, income levels at destination may be indicative of both monetary and non-monetary benefits, as suggested in the introductory paragraphs of this Section. Higher levels of such benefits should thus provide greater attractions to potential intra-provincial rural farm out-migrants. The failure to confirm these anticipations may be due

to at least two reasons. First, it may not be the level of benefit at destination that induces out-migration from rural farm residence but, instead, low levels of income in rural farm residence itself. Secondly and more important, intra-provincial out-migration from rural farm residence may depend on the differential between the situation of the potential migrant on the farm and the potential situation in non-farm residence. This differential may be gauged from the ratio of per capita non-farm income to per capita farm income.

Table 6.11 – Average Intra-Provincial Rural Farm Out-Migration Ratios and Income Levels for Three Groups of Provinces, 1956 and 1961

NOTE.—See headnote to Table 6.10.

Income type and year	High-income provinces		Middle-income provinces		Low-income provinces	
	Average income	Average migration ratio	Average income	Average migration ratio	Average income	Average migration ratio
	$		$		$	
Per capita non-agricultural income—						
1956	1,713	19.1	1,430	8.2	1,080	9.8
1961	1,681	19.1	1,437	8.2	1,052	9.8
Per capita agricultural income—						
1956	781	17.6	462	8.4	246	10.9
1961	896	17.6	579	9.5	224	9.8
Relative non-agricultural/agricultural income per capita—						
1956	4.76	10.9	3.20	8.4	2.12	17.6
1961	5.10	10.9	2.79	8.4	1.76	17.6

SOURCE: Out-migration calculated from data given in Table 6.2; income data calculated from income estimates in Appendix Table A.3.

Table 6.11 shows that the use of this ratio does not lead to the expected pattern of association. Out-migration ratios for intra-provincial rural farm migrants are on the average highest in provinces where the ratio of per capita non-agricultural income to per capita agricultural income is lowest. These out-migration ratios are also highest for the provinces with the highest per capita agricultural income. This lack of support for any of the hypothetical associations between income and rural farm intra-provincial out-migration may be attributable to errors in the data, biases in the method

of statistical analysis, or strong influences from other factors not accounted for by income measures.

The role of non-income factors in determining intra-provincial migration from rural farm areas warrants further consideration. Each of the hypotheses relating intra-provincial rural farm out-migration to income measures implicitly assumes equal propensities to migrate and equal levels of information in all units of observation. Inasmuch as propensities to migrate vary among provinces, patterns of intra-provincial migration cannot be expected to demonstrate strong relationships to patterns of income variation when compared on a cross-sectional basis. Propensities to migrate may depend strongly on the social and cultural backgrounds of the rural farm population in each province. Differing social and cultural backgrounds among provinces may produce differing degrees of attachment to rural farm and family environment. In reality, the response of migrants to income factors occurs within a given set of socio-cultural constraints which definitely do vary among provinces.

Table 6.12 fails to show any consistent patterns of association between the rural farm net migration ratios and the selected income measures. Thus, the relationships that have appeared in longitudinal analysis (Minami, 1967) fail to show up in this cross-sectional analysis. Rural farm intra-provincial net migration ratios are on the average highest (algebraically) for provinces in the middle per capita non-agricultural income group and do not increase with declining per capita non-agricultural income. Since per capita non-agricultural income may indicate levels of monetary and non-monetary benefit available through migration to non-farm areas, the level of net migration might be expected to vary inversely with the level of per capita non-agricultural income. The patterns of variation in intra-provincial rural farm net migration for the period 1956-61 do not appear to support such a hypothesis.

Intra-provincial rural farm net migration does not appear to vary directly with the per capita level of agricultural income nor inversely with the ratio of per capita non-agricultural to per capita agricultural income. The level of per capita agricultural income indicates the return to factors of production in agricultural activity and may also imply levels of services and opportunity for further absorption of factors of production in agricultural activity. The relative income measure may indicate relative levels of return and non-monetary benefit in non-agricultural and agricultural activity. Thus, intra-provincial rural farm net migration ratios might be expected to vary directly with per capita levels of agricultural income and inversely with the relative income measure. In Table 6.12, however, the middle-income provinces show strong divergence from the anticipated patterns of variation.

Table 6.12 – Average Intra-Provincial Rural Farm Net Migration Ratios and Income Levels for Three Groups of Provinces, 1956 and 1961

NOTE.– See headnote to Table 6.10.

Income type and year	High-income provinces		Middle-income provinces		Low-income provinces	
	Average income	Average migration ratio	Average income	Average migration ratio	Average income	Average migration ratio
	$		$		$	
Per capita non-agricultural income –						
1956	1,713	− 13.3	1,430	− 6.8	1,080	− 13.2
1961	1,681	− 13.3	1,437	− 6.8	1,052	− 13.2
Per capita agricultural income –						
1956	781	− 13.0	462	− 5.6	246	− 14.8
1961	896	− 13.0	579	− 7.2	224	− 13.2
Relative non-agricultural/agricultural income per capita –						
1956	4.76	− 14.8	3.20	− 5.6	2.12	− 13.0
1961	5.10	− 14.8	2.79	− 5.6	1.76	− 13.0

SOURCE: Net migration ratios calculated from data in Table 6.3; income data calculated from income estimates in Appendix Table A.3.

The failure of both intra-provincial rural farm out-migration and net migration to show patterns of variation similar to those observed in income factors may indicate not only the previously mentioned role of non-economic factors in determining propensities to migrate but also the importance of non-income factors in inducing short-distance migration. Socio-cultural circumstances may determine levels of migration response to factors indicated by per capita income levels. Much short-distance migration may, however, be undertaken in response to factors not indicated by income levels. Changes in family status and in the stage of the family life cycle, changes in labour force status and changes in educational status may in themselves induce migration (cf. Eldridge and Thomas, 1964, pp. xxxi-xxxv; and Kasahara, 1965). These changes may thus reduce the significance of per capita income measures in explaining the observed 1956-61 intra-provincial rural farm migration.

6.3.2 INTER-PROVINCIAL RURAL FARM MIGRATION AND PROVINCIAL INCOME LEVELS – Inter-provincial migration generally involves greater

migration distance and thus higher costs and risks than intra-provincial migration. The consideration of migrant characteristics in Section 6.2 indicates that one response to these increased distance-cost factors may be increased migration selectivity with regard to sex, age, education and occupation. In addition, the increased costs and risks of inter-provincial migration may enhance the significance of economic benefits available through migration, as indicated by per capita income differences among alternative provinces of destination. This Section examines the association between inter-provincial rural farm migration and provincial per capita income levels.

The levels of inter-provincial in-migration to rural farm residence among the provinces of destination might be expected to vary directly with levels of per capita agricultural income, for the reasons indicated in Section 6.3.1. Data shown in Table 6.13 are consistent with this expectation. Inter-provincial rural farm in-migration ratios vary directly with the per capita *1956* agricultural income. However, this pattern of co-variation does not hold on the basis of *1961* per capita agricultural income, as in-migration ratios to middle-income provinces, on average, fall below those for low-income provinces.

Table 6.13 – Average Inter-Provincial In-Migration Ratios for Rural Farm Areas and Provincial Per Capita Agricultural Income Levels, for Three Groups of Provinces, 1956 and 1961

NOTE.—See headnote to Table 6.10.

Income and year	High-income provinces		Middle-income provinces		Low-income provinces	
	Average income	Average migration ratio	Average income	Average migration ratio	Average income	Average migration ratio
	$		$		$	
Per capita agricultural income —						
1956	781	1.9	462	1.2	246	0.5
1961	896	1.9	579	0.6	224	1.1

SOURCE: In-migration ratios calculated from data presented in Table 6.1; income data calculated from income estimates in Appendix Table A.3.

Inter-provincial rural farm out-migration by province of destination may be expected to vary directly with levels of per capita non-agricultural income at destination. These income levels indicate to potential migrants the range of monetary and non-monetary benefits available through relocation to non-farm residence in some province other than the province of residence. Higher levels of benefit might then be expected to attract

greater numbers of migrants. The data in Table 6.14 tend to support this hypothesis. The high-income provinces, on the basis of both 1956 and 1961 per capita non-agricultural income, have, on average, the highest migration ratios. These inter-provincial rural farm out-migration ratios by province of destination decline, on average, as the non-agricultural income declines from high-income to low-income province groups.

Table 6.14 – Average Inter-Provincial Out-Migration Ratios for Rural Farm Areas by Province of Destination and Provincial Levels of Per Capita Non-Agricultural Income, for Three Groups of Provinces, 1956 and 1961

NOTE.—See headnote to Table 6.10.

Income and year	High-income provinces		Middle-income provinces		Low-income provinces	
	Average income	Average migration ratio	Average income	Average migration ratio	Average income	Average migration ratio
	$		$		$	
Per capita non-agricultural income —						
1956	1,713	0.6	1,430	0.2	1,080	0.1
1961	1,681	0.6	1,437	0.2	1,052	0.1

SOURCE: Migration ratios calculated from data presented in Table 6.2; income levels calculated from income estimates in Appendix Table A.3.

Errors in the implicit assumptions of either of the hypotheses about inter-provincial rural farm migration may account for a part of the deviation of the observations from the expected patterns. Both hypotheses assume that the propensity to migrate from any one province to any other is equal for all rural farm in-migrants or all rural farm out-migrants. It is further implicitly assumed that the effect of variations in distance between one province and a number of possible destinations is nil. If these two assumptions hold for either hypothesis, the role of provincial differences in per capita income levels in determining the magnitude of migration to either farm or non-farm residence assumes considerable significance. In reality, however, variations in social, cultural, political and geographic environments among provinces do exist, and the distance-cost of relocation from any one province to another varies greatly with the choice of province of destination. These non-income factors may thus be expected to produce variations in inter-provincial migration ratios by province of destination even when income factors are relevant.

6.3.3 TOTAL RURAL FARM MIGRATION AND PROVINCIAL INCOME LEVELS – Total (intra- plus inter-provincial) rural farm migration by province of destination may give some indication of the attractiveness of

farm or non-farm residence in any one province relative to all other provinces. Total in-migration to rural farm residence in any one province is composed of migrants from non-farm residence both within and outside that province. Thus, the flows observed with respect to each province of destination form part of the Canadian 1956 non-farm population. The share of each province in the number of out-migrants from this population may partly reflect provincial variations in the attractiveness of rural farm residence.

Similarly, provincial variations in total out-migration from rural farm residence by province of destination may demonstrate variations in the attractiveness of non-farm residence among provinces. These out-migrants were part of the 1956 rural farm population of Canada, and it is the provincial share of the out-migrants from this population that is considered here.

Per capita income levels by province may comprise a factor which in part determines the attractiveness of alternative provincial destinations to potential migrants. Provincial levels of per capita agricultural income may indicate both monetary and non-monetary benefits available to in-migrants to rural farm residence, and the total in-migration to rural farm residence by province of destination may be expected to vary directly with provincial variations in levels of per capita agricultural income. The data in Table 6.15 are consistent with this expectation. Total in-migration ratios are, on average, highest for the provinces with highest per capita agricultural income and decline as per capita income declines.

Table 6.15 – Total Rural Farm In-Migration Ratios and Provincial Levels of Per Capita Agricultural Income, Averages for Three Groups of Provinces, 1956 and 1961

NOTE. — See headnote to Table 6.10.

Income and year	High-income provinces		Middle-income provinces		Low-income provinces	
	Average income	Average migration ratio	Average income	Average migration ratio	Average income	Average migration ratio
	$		$		$	
Per capita agricultural income —						
1956	781	9.1	462	6.9	246	3.8
1961	896	9.1	579	6.3	224	4.4

SOURCE: Total in-migration ratios calculated from ratios presented in Table 6.1; income levels calculated from estimates in Appendix Table A.3.

Since total rural farm out-migration by province of destination may be related to the attractiveness of non-farm residence in various provinces of destination, an out-migration-income relationship similar to the preceding in-migration-income relationship might be anticipated. Table 6.16 supports this anticipation. Total rural farm out-migration ratios by province of destination are highest to provinces with highest levels of per capita non-agricultural income. As provincial levels of per capita non-agricultural income decline, so does the total rural farm out-migration ratio (by province of destination).

Table 6.16 – Total Rural Farm Out-Migration Ratios by Province of Destination and Provincial Levels of Per Capita Non-Agricultural Income, Averages for Three Groups of Provinces, 1956 and 1961

NOTE.—See headnote to Table 6.10.

Income and year	High-income provinces		Middle-income provinces		Low-income provinces	
	Average income	Average migration ratio	Average income	Average migration ratio	Average income	Average migration ratio
	$		$		$	
Per capita non-agricultural income —						
1956	1,713	2.2	1,430	1.6	1,080	0.4
1961	1,681	2.2	1,437	1.6	1,052	0.4

SOURCE: Migration ratios calculated from ratios presented in Table 6.2; income levels calculated from income estimates in Appendix Table A.3.

In sum, rural farm migration in the 1956-61 period shows an association with provincial levels of per capita income but this association varies among types and directions of migration stream. All types of rural farm in-migration (intra-provincial, inter-provincial and total) appear to be rather closely associated with per capita levels of agricultural income. Inter-provincial and total out-migration by province of destination show patterns of variation similar to those in per capita non-agricultural income among provinces. Intra-provincial out-migration from rural farm residence does not demonstrate a consistent pattern of association with provincial levels of per capita non-agricultural income. This divergence may indicate a decrease in the importance of income benefit factors as migration distance decreases.

6.3.4 RATES OF RURAL FARM MIGRATION AND MEASURES OF ECONOMIC OPPORTUNITY – Levels of per capita income have been considered as partial determinants of the level of migration to and from rural farm residence. Examination of migration in those terms, treating income as a

measure of benefit available, implicitly assumes that the indicated benefit is equally available to migrants in all destinations. In other words, considering only income involves the assumption that employment opportunity is equal in all destinations. Such an assumption may be highly unrealistic, particularly in a short-period cross-sectional analysis where levels of opportunity may vary significantly among units of observation. These variations in employment opportunity may account for some part of the variation in migration ratios which is not associated with income levels. In order to examine this possibility, rates of rural farm out-migration and occupational distributions of migrants were associated with indicators of economic opportunity.

The percentage change in the total non-agricultural wages and salaries by province was initially used as a measure of provincial levels of employment opportunity. Other studies have used the rate of growth of gross domestic product (Minami, 1967) and rates of growth of income per worker (Anderson, 1965; Eldridge and Thomas, 1964) in similar fashion as measures of opportunity. The choice of an indicator in this case was based partly on the lack of measures of gross domestic product by province and on the previous use of per capita income data. Either type of opportunity measure involves an assumption about the effects of changes in productivity on the demand for labour.[11]

Table 6.17 – Rural Farm Out-Migration Ratios by Type of Movement and Province of Destination and Percentage Growth in Non-Agricultural Wages and Salaries, Averages for Three Groups of Provinces, 1956-61

NOTE.—See headnote to Table 6.10.

Out-migration type	High-growth provinces		Middle-growth provinces		Low-growth provinces	
	Average change	Average migration ratio	Average change	Average migration ratio	Average change	Average migration ratio
	p.c.		p.c.		p.c.	
Intra-provincial out-migration —						
1956-61	36.9	7.1	30.2	9.5	25.8	20.3
Inter-provincial out-migration —						
1956-61	36.9	0.3	30.2	0.4	25.8	0.2
Total out-migration —						
1956-61	36.9	1.4	30.2	1.9	25.8	1.0

SOURCE: Out-migration ratios calculated from ratios presented in Table 6.2; average change in non-agricultural wages and salaries calculated from estimates of change by province in Appendix Table A.5.

Inter-provincial rural farm out-migration by province of destination tends to vary directly with provincial percentage change in non-agricultural wages and salaries (Table 6.17). Intra-provincial rural farm out-migration demonstrates the opposite relationship to levels of employment opportunity measured in this way. These different relationships by type of out-migration lend further support to the previous contention that short-distance rural farm out-migration in the 1956-61 period may be determined largely by non-economic considerations. Longer-distance inter-provincial rural farm out-migration again demonstrates a sensitivity to economic conditions.

An alternative measure of employment opportunity which places more emphasis on productivity or output per worker is non-agricultural 'service income' per worker. Non-agricultural service income is the sum of wages and salaries plus income of non-farm unincorporated business less wages paid in agriculture. It measures the monetary return to labour in non-agricultural activities, and the per worker service income indicates productivity. In the United States it has been found that levels of net migration to areas vary directly with levels of service income per worker in receiving-areas (Eldridge and Thomas, 1964, p. 368).

Table 6.18 – Rural Farm Out-Migration Ratios by Type of Movement and Province of Destination and Provincial Levels of Non-Agricultural Service Income per Worker, Averages for Three Groups of Provinces, 1951 and 1961

NOTE.—See headnote to Table 6.10.

Out-migration type	High-income provinces		Middle-income provinces		Low-income provinces	
	Average income	Average migration ratio	Average income	Average migration ratio	Average income	Average migration ratio
	$		$		$	
Intra-provincial out-migration —						
1951	2,883	19.1	2,421	8.1	2,054	9.8
1961	3,927	19.1	3,505	8.1	2,818	9.8
Inter-provincial out-migration —						
1951	2,883	0.6	2,421	0.2	2,054	0.1
1961	3,927	0.6	3,505	0.2	2,818	0.1
Total out-migration —						
1951	2,883	2.2	2,421	1.6	2,054	0.4
1961	3,927	2.2	3,505	1.6	2,818	0.4

SOURCE: Out-migration ratios calculated from ratios presented in Table 6.2; income levels calculated from income estimates in Appendix Table A. 6.

The pattern of co-variation between provincial levels of non-agricultural service income per worker and rural farm out-migration ratios by type and province of destination is similar to that observed with percentage change in non-agricultural wages and salaries (Table 6.18). Inter-provincial and total rural farm out-migration appear (by province of destination), on the basis of group averages, to vary directly with levels of non-agricultural service income per worker in the province of destination. Intra-provincial rural farm out-migration does not show a strong association to provincial levels of non-agricultural service income per worker. These patterns may again indicate the differing effects of economic factors in short- and long-distance rural farm out-migration.

The similarities in out-migration-income associations previously noted and the out-migration-opportunity associations observed here may indicate that both types of measure imply opportunity and benefit levels to which inter-provincial and total rural farm out-migration are sensitive. Intra-provincial rural farm out-migration does not demonstrate a sensitivity to any of the income-opportunity measures.

6.3.5 OCCUPATIONAL DIFFERENTIALS OF EMPLOYMENT OPPORTUNITY – For each province in Canada there is a migrant population moving into non-farm residence from rural farm residence. The labour force component of this migrant population thus becomes available for absorption into the productive occupations in the area of destination. It is the purpose of this Section to examine the association between the occupational distribution of these rural farm out-migrants at destination and occupational differentials in employment opportunity.

Employment opportunity appears to be a more important short-run determinant of migrant distribution by occupation than earnings by occupation. A hypothesis that the occupational distribution of rural farm migrants depends upon differentials in earnings by occupation involves an assumption of equal freedom of entry into all occupations. Such an assumption would be highly unrealistic. Substantial variations exist in both educational levels by occupation and costs of entry into different occupations. On the other hand, virtually every occupation has a higher level of average earnings than the farm occupation and thus provides a positive income benefit if employment opportunity exists. Thus, it may be hypothesized that the distribution of rural farm out-migrants among occupations at destination is positively associated with the level of employment opportunity by occupation.

The level of employment opportunity by occupation was measured by the percentage change in actual employment in each occupation between 1951 and 1961, excluding from this change the 1956-61 rural farm migrant population in each occupation. This exclusion of migrants removes from the growth of occupations the part that might be attributed to migrants themselves. Consideration of the occupational growth over a ten-year period permits some lag in migrant response, to whatever extent it may exist, and includes in the occupational growth migrants during the 1951-56 period. Rural farm out-migrants in the 1951-56 period may be an important source of information to potential rural farm out-migrants in the 1956-61 period. Table 6.19 associates occupational distribution *differences* between rural farm out-migrants and the non-farm labour force with the percentage change in employment by occupation.

Intra-provincial rural farm out-migrants in Canada are, on average, more heavily concentrated than the non-farm labour force in occupations with the lowest percentage change in employment. Inter-provincial rural farm migrants, on the other hand, are more heavily concentrated in occupations with highest percentage change in employment. The occupational distribution of inter-provincial rural farm out-migrants thus tends to support the hypothesis that the distribution of rural farm out-migrants among occupations at destination is positively associated with the level of employment opportunity by occupation. The distribution by occupation of intra-provincial rural farm out-migrants is the opposite of that anticipated on the basis of employment opportunity (Table 6.19).

Table 6.19 – Percentage Changes in Male Labour Force for Three Occupation Groups, 1951-61, and Differences in Rural Farm Out-Migrant and Non-farm Labour Force Occupational Distributions, Canada, 1961

NOTE.—See headnote to Table 6.10.

Out-migration type	High-growth occupations		Middle-growth occupations		Low-growth occupations	
	Average growth	Average distribution differences	Average growth	Average distribution differences	Average growth	Average distribution differences
Intra-provincial out-migration	47.2	– 0.1	22.8	– 1.4	– 9.9	1.2
Inter-provincial out-migration	47.2	6.1	22.8	– 2.7	– 9.9	– 2.4

SOURCE: Average differences in occupational distribution calculated from occupational distributions in Table 6.8; average percentage change in employment by occupation from data in Appendix Table A.7.

A significant part of the difference in distribution by occupation of intra-provincial and inter-provincial rural farm out-migrants may be attributable to different age and educational characteristics. Intra-provincial migrants are, on average, older than inter-provincial migrants and are more heavily concentrated at lower schooling levels than either the non-farm labour force or inter-provincial rural farm out-migrants (see Sections 6.2.2 and 6.2.3). These age-educational characteristics may reduce actual opportunities for intra-provincial migrants to enter the high growth occupations which are also 'white-collar' occupations (see Appendix Table A-7). Inter-provincial rural farm out-migrants, on the other hand, are both younger and more highly educated than either intra-provincial rural farm out-migrants or the non-farm labour force. These age-educational characteristics may give inter-provincial migrants freer entry into any occupation and thus permit them to choose high growth white-collar occupations.

The differences in occupational distributions of intra-provincial and inter-provincial rural farm out-migrants may also be related to the apparent differences in response to income factors. Intra-provincial rural farm out-migration does not show a definite relationship to income factors and may instead be undertaken largely for non-economic reasons, as mentioned previously. If this is the case, these short-distance migrants may move into primary, craftsmen and labourer occupation classes in which they have seasonal experience. Longer-distance inter-provincial rural farm out-migration may be undertaken on the basis of specific information about income benefits and employment opportunities.

6.4 SUMMARY AND CONCLUSION – Estimation and examination of rural farm migration patterns on the basis of the 1961 Census Population Sample illustrates the basic components of rural farm net migration in the 1956-61 period. The observed net out-migration from farm areas results from a very heavy out-migration in all rural farm areas and very small in-migration flows. By far the greater part of this rural farm out-migration is short-distance intra-provincial movement. The smaller inter-provincial rural farm out-migration flows observed demonstrate greater sex-age and occupational selectivity and greater sensitivity to economic factors than intra-provincial flows.

The failure of intra-provincial rural farm out-migration patterns to demonstrate anticipated migration-income or migration-opportunity associations may yield considerable insight into the migration process. Variations in social and cultural environment may produce substantially different degrees of migrant response to economic factors, thus rendering cross-sectional analysis fruitless. Short-distance rural farm out-migration may at the same time be a response to factors not indicated by economic benefit and opportunity measures. Varying patterns of change in agricul-

tural activity among provinces may produce a variety of 'push' factors effecting provincial variations in the levels of migration response. All of these factors may play a stronger role than provincial income levels in explaining provincial variations in short-distance rural farm out-migration.

Longer-distance, inter-provincial rural farm out-migration shows patterns of variation among provinces of destination that lend support to the hypothesized migration-income and opportunity relationships. Levels of migration into non-farm residence in different provinces from rural farm areas outside each province appear to be associated with provincial levels of per capita non-agricultural income. Inter-provincial migration also appears to be sensitive to measures of employment opportunity by occupation. Inter-provincial rural farm out-migration may thus demonstrate the basic underlying migration-economic relationships that emerge when variations in non-economic factors are reduced.

Both intra-provincial and inter-provincial rural farm migration flows may then be regarded as part of the process of growth and structural change in the economy. This process of growth and structural change occurs as variations in the rate of growth of demand for the outputs of different sectors in the economy create variations in the levels of income and economic opportunity. The rural farm population responds to increased incomes and opportunities in non-farm areas relative to farm areas by relocating to non-farm areas. This response on the part of the farm population is strongly influenced by social, cultural and demographic factors in their environment.

FOOTNOTES TO CHAPTER SIX

[1] The elasticity of demand is a measure of the responsiveness of quantity purchased to changes in income or price. The formula for calculating income elasticity of demand is the percentage change in quantity demanded divided by the percentage change in income. For price elasticity of demand, the formula is the percentage change in quantity demanded divided by the percentage change in price. For estimates of income elasticities of demand of selected Canadian farm products, see Caves and Holton, 1961, Table 80, p. 434.

[2] Estimates of the physical volume of agricultural production indicate an over-all increase of 30 to 40 per cent between 1930 and 1955. In this same period population increased 54 per cent and prices of farm products at wholesale, relative to all other commodities at wholesale, rose very slightly. See Drummond and MacKenzie, 1957, pp. 29 and 80.

[3] The discussions of regional agricultural organization and change are based on material presented in Drummond and MacKenzie, 1957, Part II, ch. 7-11.

[4] The definitions of residence type in both 1956 and 1961 were those of the 1961 Census.

[5] See Chapter Two, footnotes [5] and [6], for comments on the limitations of the alternative base populations.

[6] The base for the Canadian ratio is the 1961 rural farm population of Canada and thus the sum of the provincial rural farm populations in 1961. The weight given any provincial ratio depends on the size of the rural farm population in that province relative to the Canadian total. For example, if each province had the same proportion of the total farm population, the weights would all be equal. In reality, Ontario, for example, has a large farm population and the provincial ratio is thus heavily weighted in the Canadian ratio.

[7] "Occupational selectivity of migration" generally refers to the extent to which migrants are unevenly distributed among occupational groups.

[8] It is understood that the findings may depend upon the selected areal units, so that patterns observed in comparisons of provinces may not be applicable at the sub-provincial level.

[9] "Service income" is the sum of wages, salaries and income of unincorporated business. Cf. Lee *et al*, 1957, pp. 703-759, and Eldridge and Thomas, 1964, p. 347.

[10] Comparisons of variation in migration ratios and economic factors, in this and subsequent cases, are made on the basis of averages for three groups of provincial observations ranked in descending order for the economic variable. This method of comparison was adopted because of the small number of observations and the rather low absolute levels of the migration ratios. These ratios are so low that they may strongly reflect unsystematic errors in the Population Sample estimates. In order to reduce the impact of such errors on the observations, it was decided to group the provinces into three categories according to levels on the economic indicator in question. This grouping does reduce much of the unsystematic variation which attenuated the apparent levels of association when individual provinces are used as the units of observation.

The question is raised, however, as to whether the patterns observed after grouping provinces are purely artifacts of the grouping (and thus are consistent with our hypothesis by sheer accident). Unfortunately, there is little empirical basis for investigating this matter, particularly since it is argued here that the use of individual provinces is probably giving strong play to statistical errors because of the very low absolute magnitudes of the migration ratios. In any event, it is accepted that the results of the comparisons may be sensitive to the grouping of the provinces, and thus may be advanced securely only with the assumption that the grouping is held fixed.

This difficulty is not peculiar to the present analysis. It always crops up in analyses of data for areal units, where the findings may be sensitive both to the chosen units and to the method of analysis (to say nothing of the historical period to which the data refer). Indeed, the difficulty would appear to be inescapable when there is substantive interest in the patterns that appear *at the provincial level*. In the light of such difficulty, it is sufficient to understand that statistics seldom, if ever, demonstrate or decisively defeat a particular causal interpretation. Rather they would seem to be useful in illustrating a causal interpretation, so that it becomes a matter of opinion whether a particular illustration is cogent and persuasive.

[11] A change in the total non-agricultural wages and salaries may arise from the operation of two factors. Increased labour productivity may lead to increased per worker remuneration without any change in the volume of employment. On the other hand, an expansion of demand for non-agricultural output may produce an expanded volume of employment at fairly constant per capita levels of remuneration. In reality, these factors probably work jointly to produce expansions in total non-agricultural wages and salaries.

The use of per capita income or output measures, and spatial or temporal variations in these measures, to indicate employment opportunity, assigns most of the demand for labour to changes in productivity. It is possible, however, that an expansion in employment opportunity may be derived from an expanded demand for the output of a particular section or industry. In such a situation, per capita or per worker income might change very little despite the increased opportunity. Total wages and salaries would increase, however, as employment in the expanding sector increased. The change in total wages and salaries and spatial variation in this change for one time period may thus provide an alternative to per capita income measures as an indicator of employment opportunity.

Chapter Seven

ECONOMIC AND SOCIAL CORRELATES OF THE URBAN INTERNAL IN-MIGRATION RATIO

7.1 PURPOSE

This Chapter examines the extent to which the 1956-61 in-migration ratio[1] for an urban complex may be correlated with its combination of selected social and economic characteristics measured in 1961, where these characteristics are relevant in the explanation of the causes or consequences of areal differentials in migration rates. Questions such as the following are raised: to what extent do the urban complexes with high internal in-migration ratios tend to have markedly different values on the socio-economic measures than those with low internal in-migration ratios and what is the relative importance of individual socio-economic indicators in the above-mentioned correlation? This work is a preliminary exploration aimed at providing a part of the background information which is useful in developing a systematic analysis of the links between a community's socio-economic situation and its migration experience.

Since the socio-economic variables are measured as of 1961, they pertain to the *end* of the migration period and thus can be expected to confound causes *and consequences* of the migration. For this reason, little attempt is made to interpret the correlations in terms of the real forces which, operating in or before the 1950s, created areal differentials in the in-migration ratio. The correlations are intended to show in a fairly concrete way some manifestations of the probable interdependence between the 1956-61 in-migration ratio of an urban centre and the socio-economic characteristics of that centre as of 1961. Thus, the urban centre's migration experience could have served as a useful, though partial, indicator of its socio-economic conditions. This demonstration lays a part of the groundwork for the design of analysis and interpretation in Chapter Eight, where the measures of socio-economic characteristics are made for the *beginning*

of the migration period, thus providing a more secure framework for substantive interpretation of the statistical coefficients. These two Chapters – Seven and Eight – should be considered as two related discussions, the present Chapter being preliminary. The analysis in both Chapters is largely exploratory and is intended to contribute to the background information needed in designing more thorough studies of the factors associated with inter-urban variation in migration rates.

There is ample reason for expecting a relation between an area's in-migration ratio and its combination of the areal attributes that influence migration decisions. A wide variety of circumstances influence the decision to migrate – the desire to improve income and living standard, changes in the family life cycle, desire to reside in more congenial social or physical surroundings, inability to maintain a pre-existing standard of living, and so on. The perceived characteristics of the area of residence can be influential in the decision to migrate, and perceived attributes of the potential areas of destination influence[2] the place where a migrant chooses to settle. In turn, the concentration of migrants in an area influences its social and economic conditions.

In the discussion that follows no attempt is made to exhaust the list of variables that are relevant in an explanation of the areal in-migration ratios. For example, measures of population potential (which reflect accessibility to population centres) and of age composition (which would reflect areal rate of life-cycle changes) have not been included in the analysis. Such measures might increase markedly the level of statistical explanation of areal in-migration ratios, since they probably are significantly related to short-distance migration.

In confining attention to a few selected socio-economic variables without statistically controlling the effects of others, what Williamson and Swanson, 1966, p. 45, call a 'bold hypothesis' is made – in the sense that the list of explanatory variables is deliberately limited to exclude some that are believed to be relevant in a more complete explanation. This bold hypothesis is made in order to gauge how influential the selected socio-economic factors are *in the presence* of possibly counteracting influences from other factors. Further development of this exploratory effort should involve a more detailed statement of the underlying theoretical propositions and an expansion of the list of explanatory variables to include important geographic and demographic factors, among others, which are not dealt with here.

7.2 PROCEDURE

The achievement of the general purpose of this Chapter is attained partly through an analysis of inter-correlations among a number of selected variables that seem to reflect socio-economic factors which may underlie areal variation in migration ratios (cf. Lee 1966; Perloff, *et al.*, 1960; Kuznets and Thomas, 1957; Kuznets, 1964; Bogue, Shryock and Hoermann 1957; Ter Heide, 1963; Lowry, 1966; King, 1967; and Anderson, 1956). The choice of variables was guided by previous research and existing theory concerning areal differentials in migration ratios, and was constrained by the census data resources. Since many correlations are purely accidental, it is necessary to attempt to provide some theoretical rationale for the choice of variables.

7.2.1 SOME THEORETICAL CONSIDERATIONS – It is well known that many correlations are coincidental in the sense that they reflect no meaningfull connection between the events that are correlated. Statistical analysis *per se* does not provide a valid basis for proving the existence of a causal connection underlying observed correlations. The closest one can come to such proof is through the use of certain techniques of experiment, in which the events under study are varied under controlled conditions, and even these techniques fail to provide secure demonstrations of causal connections between events. The situation seems even more difficult when it is observed that adequate techniques of experimental design can seldom be used in the social and economic studies of human populations, and this comment certainly applies to the present study. Thus, the most that can be done here in support of the claim that causal connections underlie the observed correlations is to sketch a set of theoretical propositions which would seem to provide a rationale for the assumption that an area's migration experience is causally linked with its socio-economic conditions and changes.

Even this procedure is basically faulty since there are many different sets of theoretical propositions that may be consistent with the data observed. In fact, the justification of the procedure rests largely on the assumption that it assists us to organize useful (even though possibly false) interpretations of the observed correlations, rather than on the false proposition that the mere statement of a 'theoretical model' produces an escape from the *post hoc ergo propter hoc* type of argument in interpreting the observed correlations. Thus, the following set of theoretical propositions is merely a vehicle for organizing interpretations of the statistics presented in this and the next Chapters.

In attempting to provide a rationale for the general hypothesis stated above, there is a significant body of theoretical literature upon which to

draw (see Section 1.2 for examples). Running through this literature is the basic idea that areas vary in their attractiveness for a potential migrant. A potential migrant may elect to remain in his present area of residence or to choose another. He chooses his area of residence according to its apparent degree of attractiveness relative to the degrees of attractiveness he attributes to the other areas. Thus, the extent to which an area gains migrants depends partly on the relative degrees of attractiveness attributed to the area by potential migrants (cf. Ter Heide, 1963; Gossman, *et al.*, 1967) and this factor of attractiveness may be seen as a basic element in the connection between the characteristics of an area and its migration experience.

What characteristics of an area determine its degree of attractiveness? Before this question is answered, it is necessary to observe that an area does not have the same degree of attractiveness to all potential migrants. Its degree of attractiveness varies from one migrant to another and the areal characteristics that determine attractiveness may differ from one migrant to another. However, the areal characteristics that determine attractiveness to at least one migrant may be listed; judging from the existing literature on the analysis of migration, the list would seem to include geographic, demographic, economic and social variables.

Is there a single causal mechanism (for determining migration) into which these variables are incorporated? If so, it would be reasonable to seek an adequate substantive explanation of an area's migration experience (as measured by some selected technique) in a 'theoretical model' which postulates a single causal mechanism. However, the answer to the question appears to be negative, mainly because an area's migration experience, however measured, depends on an *aggregate* of several migrants, each of whose migration may involve a different causal mechanism. There will be marked variation among individual migrants in regard to the existence or strength of such variables as the desire to improve income or living standard, changes in the stage of the individual or family life cycles, the desire to reside in more congenial social or physical surroundings, inability to maintain a pre-existing standard of living, and so on. Thus, several different causal mechanisms should be postulated, each with its own theoretical model, to explain all migration decisions. The *areal aggregation* of the effects of such decisions, which is the procedure followed in measuring an area's migration experience, is a resultant of several different causal mechanisms. The causal mechanism that applies most frequently in a specific aggregate of migrants is the one that will provide the most effective substantive explanation (in terms of a theoretical model) of migration for that aggregate; but the degree of effectiveness may be far from complete and may vary over time and space. Thus, by varying the

historical and geographic context of migration, the need may arise to vary the theoretical model that is set forth to explain the areal differentials in migration levels and rates.

The fact that the migration experience of a given area, however measured, is a resultant of several causal mechanisms determining the migration decisions of a variety of individuals makes it practically impossible to avoid arbitrary decisions in selecting the indicators that are to be statistically correlated with this experience. Each causal mechanism may be associated with a specific theoretical model, and from the articulation of this model certain variables may be specified as indicators of factors explaining migration within the scope of the stated theoretical model.[3] Here, however, several theoretical models may be relevant (because the thing being explained is a resultant of several causal mechanisms), so that the choice of indicators for the statistical explanation of the areal aggregation of migration decisions is thus less easily rationalized. It might appear that if there are n relevant theoretical models and each one leads to the specification of m_i indicators, then the statistical analysis should simply make use of the sum of all these m_i indicators from $i = 1$ to $i = n$ (for example, if the same number of m indicators is specified for each model, the total number of indicators is n-times-m). Aside from the likelihood that it would not be feasible to handle all these simultaneously (mainly because of sample size limitations), the phenomenon of statistical redundance (see Appendix D, Section 2.1) would create serious problems in the interpretation of the results of the statistical analysis. In short, it is impractical to handle simultaneously all the variables that would be specified through the articulation of all the relevant theoretical models. An apparently reasonable compromise (for the purposes of statistical analysis) would be to take the one or two most important variables from each of the n relevant theoretical models. This approach is partially adopted in the work that follows.[4]

The adoption is partial mainly because there does not yet exist anything close to an adequate articulation of the various theoretical models that are relevant in the explanation of migration decisions. Most of the existing theoretical work is concentrated on economic variables (in the development of what may be loosely termed 'economic opportunity models') or on geographic and demographic variables (in the development of so-called 'gravity models').[5] In this theoretical work we can point to a number of partially developed models and to empirical research in which certain factors appear to be recurrently useful in the analysis of areal differentials in migration. The choice of variables in the analysis that follows has been guided largely by the ideas embodied in these partially developed models and empirical research (cf. Lee, 1966; Eldridge and Thomas, 1964; Bogue, Shryock and Hoermann, 1957; Bogue and Hagood, 1955; Lowry,

1966, Lee, 1952; Rogers, 1967; Ter Heide, 1963; Kono and Shio, 1966; and Anderson, 1956).

On the basis of the empirical research and the partially developed theoretical models contained in the above-mentioned literature, it might be said that the factors influencing the areal migration pattern are economic (including such matters as employment rates, work opportunity in specific occupations, industrial and occupational structure, income and wage levels), geographic (including accessibility to major population and economic centres, regional location and population density), demographic and social (such as educational structure, ethnic composition, nativity composition).[6] The work that follows is focused upon socio-economic factors.

In the foregoing discussion it was assumed that a potential migrant implicitly ranks alternative areas of destination along some scale of preference. Here is advanced, as a basic assumption, the idea that the economic characteristics of an area that influence the potential migrant's scale of preference are those that seem to bear upon this standard of living. Holding constant the relevant non-economic considerations that influence the potential migrant's preference scale, this person would aim to improve (or at least maintain) his standard of living by moving to his chosen area of destination, although the improvement may not be expected to materialize in the short run. Thus, he would appraise the alternative areas in terms of their *apparent* 'abilities' to provide him with (a) work opportunities in his occupation at advantageous income levels and (b) an array of services and goods that seems commensurate with his desired style of life. These are many-faceted aspects of an area's characteristics, and for their measurement a variety of variables exists. Each of the variables reflects some relevant areal characteristic and suppresses others, and reflects some of the influences of other variables (through its correlation with them) so that it would be unwise to attribute causal efficacy to any single variable purely on the basis of its statistical manifestations.

It is possible to identify some of the aspects of an area's economy (which can be reflected in census statistics) that have a bearing upon its 'abilities' as a location for job opportunities in a variety of occupations, as a source of relatively high incomes in specific occupations, and as a provider of a wide variety of goods and services. The area's income and employment levels would clearly be relevant, as would its absolute and relative concentrations of industrial sectors which are prominent in the growth of income and employment. Also relevant would be the importance of the centre as a supplier of goods and services to *other* urban centres, as well as its importance as a marketplace. Also, the centre's size should be a fair indicator of the variety of goods and services that it makes

available to potential consumers. These aspects of an urban centre's economy, as well as others that might be noted in a more thorough discussion, are reflected in varying degrees by 15 variables which have been defined for use in this Chapter (see the second to the 15th of the variables listed in Table 7.1).

The recognition that can be given in this Chapter to the social dimension of the potential migrant's preference scale is severely limited. This comment applies particularly to the important matters (a) of inter-personal contacts between the potential migrant and members of the populations at the alternative destinations, and (b) of the extent to which the potential migrant perceives the socio-cultural groupings at each destination as providing opportunities for apparent improvements in his social status and for satisfying inter-personal relations. Such dimensions of the migration decision cannot be tapped effectively with census statistics. For this Chapter, an attempt is made simply to identify rough indicators of the social heterogeneity[7] of the population at an urban centre, on the assumption that there is a positive association between the opportunities for economic and social advancement at a given urban centre and the social heterogeneity of its population.[8]

7.2.2 TECHNIQUES USED – It is a basic assumption that the various economic and social factors mentioned above are interdependent. (Accepted as a fundamental axiom is the view that the basic dimensions of a human community are interdependent.) Thus, one would expect inter-correlation among the 17 socio-economic variables listed in Table 7.1, so that in an empirical analysis of the association between areal migration rates and socio-economic factors these variables are statistically redundant (cf. Spiegel, 1961, p. 272; Farrar and Glauber, 1966). The great majority of the statistical explanation (of areal migration differentials) available from these 17 variables can be obtained by a smaller number of indicators drawn from among them. In order to select these indicators, a study of the inter-correlations among the 17 variables should reveal a number of sub-groups, where there is relatively high inter-correlation within sub-groups and relatively low inter-correlations between sub-groups. Each sub-group may then be *represented* by one *indicator variable*.[9] Table 7.1 indicates the six sub-groups (or clusters) identified. The technique used for this identification is based on the underlying principles of cluster analysis (cf. Tryon, 1955), and is outlined in Section D.2 of Appendix D.

Each cluster of variables is assumed to represent a group factor[10] – a group of closely interrelated characteristics of an area (see Appendix D, Section D.1). The group factors are given names (see Appendix E) which are reminiscent of the areal economic and social dimensions (relevant to

Table 7.1 – List of Variables for Analysis of the 1956-61 In-Migration Ratio for Urban Complexes, Canada

Group factor name[a]	Definitions of the variables[b]
In-migration rate	Y_1 = 1956-61 in-migration ratio[c]
Tertiary activity specialization	X_1 = 1961 proportion with some university education or university degree among males aged five and over who were not attending school[d]
	X_3 = 1961 proportion in the labour force among females aged 14 and over (crude female labour force participation rate)
	X_7 = 1961 proportion in clerical occupations among females in the labour force[e]
	X_{10}* = 1961 proportion in wholesale trade, finance, insurance, real estate and services to business management, among males in the labour force
	X_{14} = 1961 wholesale sales per capita[f]
Social heterogeneity	X_2* = 1961 proportion of the population which was born outside Canada
	X_{16} = 1961 proportion of the population which had English only or English and French as the official language spoken
Income	X_4 = Proportion working at least 40 weeks at a rate of 35 or more hours per week in the year preceding the 1961 Census, among male wage-earners
	X_5* = Proportion earning at least $4,000 in the year preceding the 1961 Census, among male wage-earners
	X_{11} = Proportion reporting total non-farm income of at least $4,000 in the year preceding the 1961 Census, among males with non-farm income and aged 15 and over in 1961
Modernity of economic structure	X_6* = 1961 proportion of the male labour force in professional and technical occupations
	X_9 = 1961 proportion in fabricating industries[g] among male labour force which was engaged in manufacturing
	X_{17} = 1956 population size
Manufacturing specialization	X_8* = 1961 proportion of the male labour force in manufacturing
	X_{15} = 1961 value added by manufacturing per capita[h]
Intensity of trading activity	X_{12} = 1961 retail sales per capita[i]
	X_{13}* = 1961 service trade receipts per capita[j]

[a] For discussion on the concept of *group factor* and of the rationale underlying the names, see text above; Appendix D, Section D.1; and Appendix E, Sections E.1 and E.2.

[b] The symbols Y_1, X_1, X_3, etc., are used to identify variables in the source tables and are employed here for easy cross-reference.

[c] See Table 2.1, footnote [c].

[d] A narrower age group is desirable but the requisite data are unavailable for urban centres outside the Census Metropolitan Areas.

[e] In all variables measuring aspects of the industrial or occupational distribution of the working force, or of the concentration of wage-earners among earning levels, the 'not stated' cases are not removed from the totals (or distributed in some specified way) before calculating the relevant proportions. Any justifiable adjustment for these cases (usually less than three per cent of the working force) would have a negligible effect on the correlation measured product-moment correlation coefficients.

[f] The data on wholesale sales are available for cities of 10,000 and over only (among urban centres). To obtain the ratios for a given Metropolitan and Major Urban Area the data for its cities of 10,000 and over were aggregated.

[g] The industries in question are clothing, printing, publishing and allied, metal fabricating, machinery, electrical products, chemicals and chemical products.

[h] See footnote [f].

[i] The comment made in footnote [g] applies here as well as to the Major Urban Areas. The requisite data for whole Census Metropolitan Areas were available.

[j] See footnote [i].

* Indicates the variable chosen as the group factor indicator (see Chapter Seven, Section 7.2 and Appendix E, Section E.1). Generally, the variable having the maximum sum of correlations (absolute values) with other variables within the group was chosen as the indicator. Where the group has only two members, the variable having the highest correlation with the in-migration ratio was chosen as the indicator.

the migration decision) mentioned in the foregoing theoretical discussion. These names are intended to suggest multi-dimensional socio-economic factors, rather than simple uni-dimensional variables, and the subsequent interpretation of the statistical data will be made in terms of these factors.

The first factor named is "tertiary industry specialization". This refers to the extent to which the production activity in an urban complex is focused in the areas of service, trade and commerce; particularly in the activities that have had unusually rapid growth of labour demand in the 1950s (see Appendix E for related discussion). The next four group factor names (Table 7.1) are largely self explanatory in regard to the features of an urban centre which they are intended to suggest – income levels, concentration of the work force in the more technologically sophisticated activities, specialization in manufacturing and per capita receipts from trade and services. The last group factor name is "social heterogeneity", and this is intended to reflect the variety of socio-cultural groups present in the urban centre. In all cases, the definition of indicators of these factors has been constrained by the data content and tabulation formats provided in the available census statistics. Appendices D and E give more thorough discussions of the selection of these names and indicator variables.

A grouping of *n* variables into *m* clusters on the basis of their observed correlation coefficients may be said to be the best available *m*-grouping of the *n* variables when the shifting of any variable from one group to another lowers the relative similarity[11] within both groups. This grouping is the best available 'six-grouping' of the 17 variables, given the observed matrix of correlation coefficients presented in Appendix Table A.8. Harman, 1960, pp. 128-132, describes a measure that is helpful in judging the effectiveness of the grouping of variables from their inter-correlation matrix. This measure, called "Holzinger's B-coefficient", increases through values greater than 100 as the effectiveness of the grouping increases (see Appendix D). Harman suggests that a group be considered acceptable when its B-coefficient is greater than 130 (Harman, 1960, p. 130). This value is unavoidably arbitrary and is based upon a range of experience with grouping exercises.[12]

The B-coefficients for the six selected clusters are as follows:–

Group factor name	Number of variables	B-coefficient
Tertiary activity specialization	5	168
Social heterogeneity	2	253
Income	3	304
Modernity of economic structure	3	144
Manufacturing specialization	2	386
Intensity of trading	2	302

Thus the grouping of the 17 selected variables satisfies the criterion for the best six-grouping of the 17 variables (given the observed inter-correlation matrix), and Holzinger's B-coefficients for the groups suggest that the grouping is effective.

Table 7.2 shows average correlation coefficients among the variable clusters.[13] Specialization in tertiary activities has positive correlations with social heterogeneity, income, modernity of economic structure and trading intensity.[14] Manufacturing *specialization* tends to be negatively correlated with tertiary activity specialization, as one might expect.

Table 7.2 – Average Product-Moment Correlation Coefficients Among Variable Clusters, for 102 Urban Complexes[a] of 10,000 and Over, Canada, 1961

(Based on absolute values of correlation coefficients)

Group factor name[b]	Tertiary activity speciali-zation	Social hetero-geneity	Income	Modernity of economy	Manu-facturing speciali-zation	Intensity of trade
Tertiary activity specialization	–	0.33	0.21[c]	0.31	0.26[d]	0.27
Social heterogeneity..	0.33	–	0.41	0.13	0.09	0.34
Income	0.21[c]	0.41	–	0.11	0.17	0.09
Modernity of economy	0.31	0.13	0.11	–	0.06[c]	0.12
Manufacturing specialization	0.26[d]	0.09	0.17	0.06[c]	–	0.24[d]
Intensity of trade	0.27	0.34	0.09	0.12	0.24[d]	–

[a] "Urban Complex" means a Census Metropolitan Area, or a Census Major Urban Area, or (for centres outside of MAs or MUAs) an incorporated urban centre. For further discussion see Stone, 1967[a], Chapter Four and Appendix E.

[b] See Section 7.2, Appendices D and E, and Table 7.1.

[c] The sign of at least one half the averaged correlations is negative; but the proportion of negative signs is not much above one half.

[d] Almost all (if not all) of the averaged correlations have negative signs.

SOURCE: Appendix Table A. 8.

Having selected an indicator variable for each of the six group factors, the next task is to measure the pattern of association between the areal variation in these six indicators and that in the five-year in-migration ratio, for the 102 urban complexes of 10,000 and over in 1961. The six indicators are considered simultaneously in this measurement, so that the multiple correlation coefficient (implying in this case a linear combination of the six indicators) serves as a general summary measure of the degree of association. This measure is supplemented by a coefficient

of prediction accuracy (defined in Appendix F, Section F.2) which gauges the accuracy with which an area's value on the in-migration ratio may be predicted from a knowledge of its combination of values (in a multiple linear least squares regression) on the six indicator variables. It is also useful to consider the relative importance of each of the indicator variables in terms of contribution to the value of the multiple correlation coefficient, and a measure has been designed to permit this consideration (see Appendix D, Section D.3). As a further investigation of the above-mentioned pattern of association, the direction (either positive or negative) of the co-variation between each indicator variable and the five-year in-migration ratio is examined. The interpretation of the statistical data provided by these measurements is made largely in terms of the group factors for which the indicator variables stand.[15]

7.3 FINDINGS

In view of the continued accumulation of relevant findings from other research, it would be surprising to fail to find a significant degree of multiple correlation between the group factor indicators and the five-year in-migration ratio. The data for this Chapter bear no such surprise, as they confirm the expectation of a systematic association between the inter-urban variation in the socio-economic indicators and that in the five-year in-migration ratio. The multiple correlation coefficient is 0.53; a value that would occur less often than once in every hundred samples (each with 102 observations) drawn from a population in which the true multiple correlation is zero (see Appendix F) so that this coefficient would rarely occur by chance.[16] Thus, at the level of correlation analysis, it can be asserted that the data confirm the expectations. It is necessary to go beyond this level into the deliberate and careful design of appropriate experiments (which the existing statistics do not permit) in order to assert that the data confirm the hypothesis that causal inter-relations underlie the results of the correlation analysis; but it can at least be suggested that the data are generally consistent with the theoretical ideas set forth in Section 7.2.

The strength of the multiple correlation is rather modest, however, since only 28 per cent of the inter-urban variance in the five-year in-migration ratio may be attributed to the selected indicator variables. Another, and probably more pertinent, measure of the strength of association is the coefficient of prediction accuracy, which varies between zero and a maximum of 100 per cent (see Appendix F, Section F.2). This coefficient measures the extent to which an area's in-migration ratio is accurately predicted from its combination (by way of a linear regression) of values on the six indicator variables. In this case the coefficient of predic-

tion accuracy is 41 per cent, so that, given the values for an urban complex on the selected socio-economic indices, it is possible to predict its five-year in-migration ratio with roughly 41 per cent (out of a maximum of 100 per cent) accuracy.[17]

The relatively low degree of multiple correlation is partly due to the fact that variables correlated with that migration which is due to life-cycle changes[18] are not included among the group factors. The majority of the urban complexes are relatively small areal units. Thus a significant portion of the in-migration to these units must be very short-distance movements by persons who are changing residence in response to changes in their life-cycle stage (see Chapter Two, footnote[6]). (This may be called 'life-cycle migration'.) These local-area residence changes connected with life-cycle shifts would be quite insensitive to the kinds of inter-urban differences being measured by the selected variables. The low degree of association may also reflect biases in the measure of in-migration rate, since this measure depends partly on out-migration. (See footnote[1] and Chapter Two, footnote[6]; in order to correct for this difficulty, the base of the ratio should include the out-migrants.)

The level of multiple correlation might also have been raised markedly if a measure of population potential had been included among the independent variables. Basically, the population potential of an urban complex refers to its degree of proximity to large agglomerations of population, and it may be considered as a factor involving location and population distribution (cf. Isard, 1960, pp. 501-504). A measure of population potential has been a major contributor to high multiple correlations in several analyses of migration as a dependent variable varying over areas (cf. Anderson, 1956; Lowry, 1966; Rogers, 1967; Kono and Shio, 1965; and Gossman, *et al.*, 1967). The detailed patterns of partial correlation and regression coefficients in these analyses show clearly that without the measure of population potential much lower multiple correlation coefficients would have been observed with the selected variables. In other words, the general level of multiple correlation reported above does not seem unusual when the population potential factor is excluded from the independent variables.[19]

7.3.1 RELATIVE IMPORTANCE OF INDICATORS – Among the six indicator variables the most important one, in terms of contribution to the above-mentioned multiple correlation, is that which stands for specialization in tertiary activities. In these activities were concentrated the most rapid increases of labour demand in the 1950s (cf. Wilson, Gordon and Judek, 1965, pp. 261-267). The urban centres with higher-than-average concentrations in such activities benefited from the increases and thus

were particularly attractive to migrants. In addition, centres that had rapid increases of population from migration may have thus fostered market conditions favourable to the expansion of the tertiary sector.

The indicator variable for tertiary sector specialization accounts for almost one half (see Appendix D) of the above-mentioned multiple correlation with the in-migration ratio. Almost another one fourth of this multiple correlation is contributed by the related index of the intensity of trading activity in an urban centre. Among the remaining four indexes, the most important are the indexes of manufacturing specialization and income. Table 7.3 shows the relevant coefficients.

Table 7.3 – Measures of Association Between Group Factor Indicators and the Five-Year In-Migration Ratio,[a] 102 Urban Complexes of 10,000 and Over, Canada, 1956-61

Group factor names	Range of zero order correlation coefficients[b]	Zero order correlation coefficient with index variable[c]	Third order partial correlation coefficient with index variable[d]	Relative importance in multiple correlation[e]
				%
Tertiary activity specialization	0.10 to 0.40	0.40[f]	0.29	46
Social heterogeneity	0.33	0.33	0.04	1
Income	0.13 to 0.20	0.17	0.21	14
Modernity of income	– 0.21 to 0.12	0.12	– 0.06	1
Manufacturing specialization	– 0.36 to – 0.20	– 0.36	– 0.17	14
Intensity of trading activity	0.36 to 0.47	0.36	0.19	24

[a] See Table 7.1, footnotes [a] and [f] particularly.

[b] In each row are shown the lowest and the highest correlation coefficients where the in-migration ratio is always one of the correlated variables and the other is a variable comprising the named group factor. Just one number in this column means that all coefficients are the same or that only one variable is listed under the group factor name (see Table 7.1).

[c] Each correlation coefficient involves two variables, one of which is the five-year in-migration ratio. The other is the selected index variable for the group factor named in the pertinent row.

[d] The calculations for this column were done with desk calculators. For this reason the number of variables held constant was confined to three. In each case the three variables held constant included that which had the highest correlation with the index variable in question, and together they explained a great majority of the variance which could be accounted for by the six variables. For the first, third, fourth and sixth rows, the variables are three of X_5, X_6, X_{10} and X_{13}; the fourth being the index variable being correlated with the in-migration ratio. For the second and fifth rows, the variables held constant are X_5, X_{10} and X_{13} (see Table 7.1).

[e] See Appendix D for explanation.

[f] For approximate assessment of statistical significance see Appendix F, particularly inequality (5).

SOURCE: Appendix Table A. 8.

The indicator variable for tertiary activity specialization varies directly with the in-migration ratio, as the former shows a positive partial regression coefficient.[20] Increases (from one urban complex to another) in the tertiary sector specialization factor were associated with increases in the five-year in-migration ratio. A similar direction of co-variation is shown for the indicator variables of three other group factors – income, intensity of trading activity and social heterogeneity. In general, an urban complex that had higher-than-average values on (a) the concentration of work force in tertiary activities associated with the inter-city flows of goods and services, (b) per capita income levels, (c) the per capita receipts from retail trade and services, and (d) the variety of socio-cultural groups in the population, tended strongly toward relatively high values on the five-year in-migration ratio.

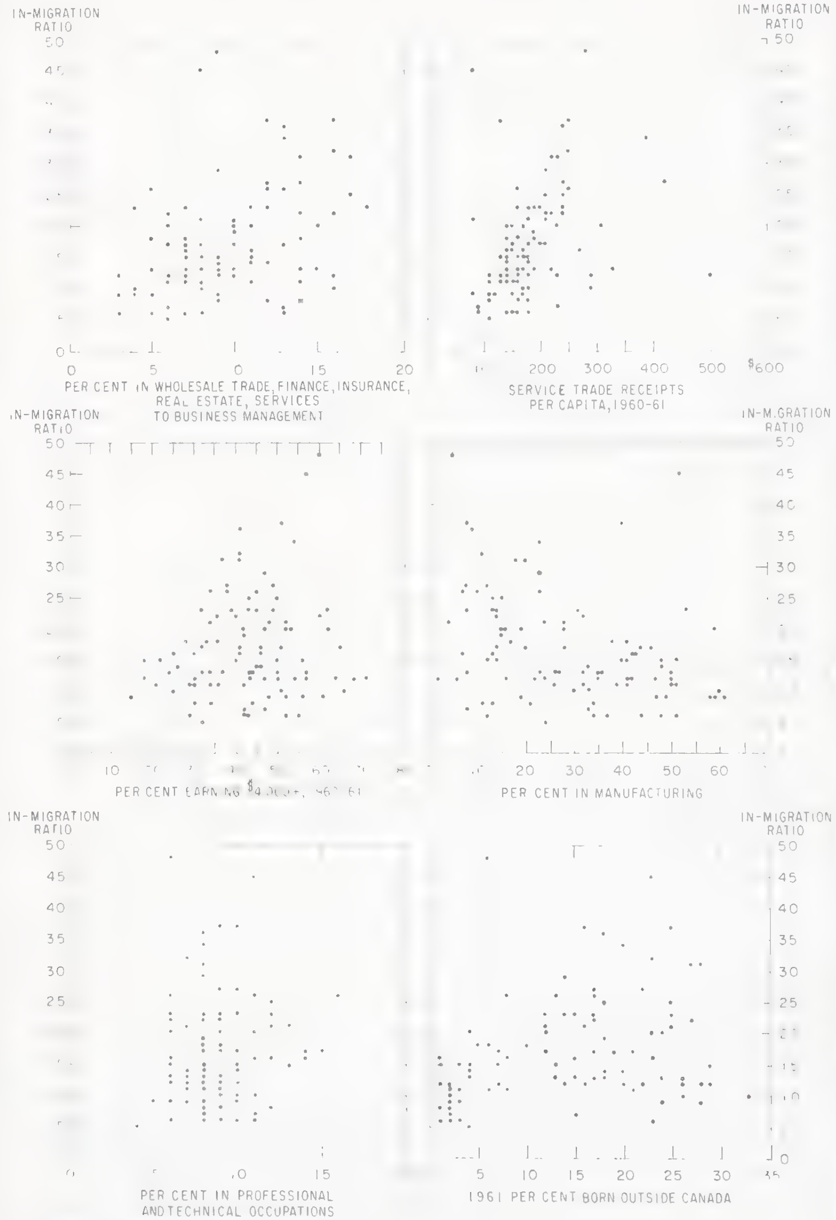
For two of the six group factors, manufacturing specialization and modernity of the economic structure, the data show an inverse direction co-variation between the indicator variables and the in-migration ratio. In the case of the latter factor (which is represented by the proportion of the working force in professional and technical occupations) the partial regression slope as well as the relevant correlation coefficients (see Table 7.3) are so close to zero as to be negligible.

In the case of manufacturing specialization, however, there is a clear and distinct tendency for increases (from one urban complex to another) in manufacturing specialization to be associated with *decreases* in the in-migration ratio. Table 7.3 shows zero order and partial correlation coefficients of −0.36 and −0.17, respectively; and the partial regression slope is substantial (twice is standard error) and negative.[21] In general, the greater an urban centre's concentration in manufacturing activity the less significant was the five-year in-migration as an element in the size of its 1961 population. Given the limited analytical scope of the research conducted for this monograph, it would be hazardous to offer any firm reasons for this finding. However, the fact that manufacturing was not a high-growth sector (in terms of labour demand at the national level) in the 1950s (cf. Wilson, Gordon and Judek, 1965, pp. 261-267) is probably an important reason for this finding.

Further detail on the pattern of co-variation between the five-year in-migration ratio and the individual group factor indexes is shown in Chart 7.1. In regard to the indicator variables for the four most important group factors, the scatter diagrams show that it is particularly at the higher values of these variables[22] that the correlations tend to become attenuated. From these diagrams it might be said that at low levels on the indicators of tertiary sector specialization and trading intensity (the

CHART - 71

SCATTER DIAGRAMS SHOWING ASSOCIATION BETWEEN 'GROUP FACTOR' INDICATORS AND THE IN-MIGRATION RATIO, FOR 102 URBAN COMPLEXES OF 10,000 AND OVER IN 1961, CANADA, 1956-61



Source: Same as Appendix Table A 8.

Table 7.4 – Joint Distribution[a] of the Urban Complexes of 10,000 and Over[b] Among Levels of the Group Factor Indicators[c] and the Five-Year In-Migration Ratio, Canada, 1956-61

Item	Intensity of trading indicator above median[d]				Intensity of trading indicator below median			
	Income indicator above median		Income indicator below median		Income indicator above median		Income indicator below median	
	Modernity indicator above median	Modernity indicator below median	Modernity indicator above median	Modernity indicator below median	Modernity indicator above median	Modernity indicator below median	Modernity indicator above median	Modernity indicator below median
	A	B	C	D	E	F	G	H
Tertiary activity indicator above median								
In-migration ratio above 67th percentile	0.77	0.63	0.46	0.61	0.47	0.13	0.16	0.11
In-migration ratio between 33rd and 67th percentiles[e]	0.21	0.33	0.38	0.32	0.41	0.48	0.42	0.39
In-migration ratio below 33rd percentile	0.02	0.04	0.15	0.06	0.12	0.38	0.42	0.50
	I	J	K	L	M	N	O	P
Tertiary activity indicator below median								
In-migration ratio above 67th percentile	0.25	0.57	–	0.31	0.06	0.07	–	0.03
In-migration ratio between 33rd and 67th percentiles[e]	0.44	0.30	0.46	0.57	0.34	0.25	0.25	0.41
In-migration ratio below 33rd percentile	0.31	0.13	0.54	0.12	0.60	0.69	0.75	0.56

[a] Each column adds to 1.0, barring rounding error, and it shows the estimated probabilities that an area will fall in each of the specified ranges of the migration ratio *on the condition* that it has the specified combination of 'values' on the group factor indexes. For example, the number in the top row of column A shows that if an area had values *above* the median on all four of the group factor indices, its probability of having an in-migration ratio above the 67th percentile is estimated at 0.8 – a very high probability. The top row of column P shows that the corresponding probability for an area which had values *below* the median on all four indexes is less than one half of one per cent – a very low probability. The estimation of the distributions is explained in Appendix G.

[b] The total number of urban complexes is 102. See Table 7.2, footnote [a].

[c] See Table 7.1, footnotes [a] and [f], and Appendices D and E for the explanation of the concept of "group factor" and of the group factor names, and for the identities of the group factor indicators.

[d] Each designation "above median" refers to cases which fall at or above the median. The "median" is the value which divides the distribution into two halves, with the highest one-half of the values lying at or above it.

[e] The designation "between 33rd and 67th percentiles" refers to cases which *either* fall between or are equal to these values. The highest one third of the values fall at or above the 67th percentile, while the lowest one third of the values fall at or below the 33rd percentile.

SOURCE: Same as Appendix Table A.8.

two most important contributors to the multiple correlation) there was a strong tendency toward low in-migration ratios. As the levels of these indicators increase so does the tendency toward high in-migration ratios but the tendency weakens as the high values of the variables are approached. Thus it is particularly at the higher scores on the group factor indicators that additional variables not included in this analysis are needed to markedly improve the statistical accounting for the areal variation in the five-year in-migration ratio.

Rough impressions of the pattern of association between the group factors considered simultaneously and the five-year in-migration ratio may be obtained from Table 7.4. If an area fell below the median value on each of the group-factor indicators *simultaneously*, the odds were less than one in 10 that it would fall among the highest one third of the values of the in-migration ratio. At opposite extreme, if an area fell above the median value on each of the group-factor indicators simultaneously, the odds jumped to eight in 10 that it would be in the highest one third of the in-migiation ratio values. Between these two extremes, the percentage distribution of areas among levels of the in-migration ratio was governed mainly by the indicator variables for the tertiary sector specialization and trading intensity factors. The table shows that shifts (above the median to below the median and *vice versa*) in the values of these two variables produce the sharpest changes in the percentage distribution of areas among levels of the in-migration ratio. In addition, shifts in the income factor do produce marked and systematic changes in the distribution of areas among levels of the five-year in-migration ratio.

7.3.2 REGIONAL DIFFERENTIALS IN THE PATTERN OF ASSOCIATION – By considering selected sub-groups of the 102 urban complexes, some regional variations may be observed in the pattern of inter-correlations among the socio-economic indicators and the in-migration ratio. Two different groupings of these urban complexes were defined for this purpose. In the first, the centres were grouped according to whether they were in the east (Quebec and Atlantic region), in Ontario, or in the west (the Prairies and British Columbia), there being too few observations to permit further breakdown. The second grouped the centres into (a) Census Metropolitan Areas (MAs) or Census Major Urban Areas (MUAs), and (b) others (some were Census Urbanized Areas and the remainder were single incorporated centres).

The first question asked was whether the 18 × 18 correlation matrices for each of these five sub-groups (see Appendix Table A.8) differ significantly from that for all 102 units (henceforth called the 'general' correlation matrix). It was also of interest to determine whether the 18 × 18

correlation matrices within each of the two sets of groups (regional and 'metropolitan') differ significantly from each other. The answer to both questions is 'yes', given the selected measure of difference and statistical inference procedure (see Appendix F). A measure of relative deviation (ranging from zero to 100 per cent) between two correlation coefficients was defined (see Table 7.5, footnote [a]) and the mean relative deviation between the corresponding coefficients for two correlation matrices was calculated. In each case the estimated standard error of this mean is

Table 7.5 – Measures of Deviation Between Correlation Matrices[a] for Sub-groupings of the 102 Urban Complexes of 10,000 and Over, Canada, 1956-61

Item	Deviation of each regional matrix from the general one[b]					
	General	East	Ontario	West	MA and MUA	Other
Mean	--	7	8	11	6	4
Standard error	—	0	1	2	0	0
	Deviations among the regional matrices[c]			Deviation between MA and MUA and other		
Mean	12			9		
Standard error	4			0		

[a] Consider N variables X_1, X_2, X_n. The correlation coefficients (product-moment) between all possible pairs of these variables (X_1, X_j) generates a correlation matrix. With two different sets of variables but with the same list of variables, two comparable correlation matrices can be calculated. Let "${}_ar_{ij}$" be the correlation between variables X_i and X_j in one of these matrices, and "${}_br_{ij}$" be the corresponding value in the other matrix. The difference between these two values must be between 0 and 2, and the measure of *relative deviation* between the two values is $d_{ij} = 100/ {}_ar_{ij} - {}_br_{ij}/2$, where $O \leq d_{ij} \leq 100$. To compare two matrices d_{ij} is calculated for all possible pairs of variables (X_i, X_j). The mean of these calculated values of d_{ij} is the *mean relative deviation* between the two correlation matrices. The standard error (square root of the variance) of the d_{ij} values is also calculated.

[b] The observations under each heading are as follows:

General = all 102 urban complexes

East = units in the Atlantic region and Quebec

Ontario = units in Ontario

West = units in the Prairies and British Columbia

MA and MUA = 1961 Census Metropolitan and Major Urban Areas

Other = units which are not MAs or MUAs.

[c] The figures pertain to the mean and standard error among the three pairs of matrices generated from east, west and Ontario.

SOURCE: Appendix Table A.8.

practically zero, mainly due to the large number of differences (153 for each pair of 18 · 18 correlation matrices). As a result, the observed means, although modest in size, would arise with extreme rarity in samples of 153 differences drawn from populations where the true mean was zero in each case (see Appendix F for the rationale underlying this statement). Thus the data indicate significant regional differentials in the pattern of inter-correlations among variables associated with the five-year in-migration ratio (see Table 7.5), suggesting the possibility of significant regional interaction among the factors determining the inter-urban variation in in-migration ratios.[23]

Differences among the sub-groupings of areal units were also measured in regard to just those seventeen correlation coefficients involving the in-migration ratio. Thus, instead of comparing whole 18 · 18 correlation matrices, we compared the 17 · 1 correlation vectors, whose elements are the coefficients pertaining to the in-migration ratio. Again the mean relative deviations are significantly greater than zero. Since there are only 17 differences for each pair of correlation vectors the estimated standard errors of the mean are more substantial than those shown in Table 7.5 (see Table 7.6). Yet in each case the probability of the observed mean (in a sample of 17 differences) drawn from a population with a true mean of zero is less than 0.03 (see Appendix F for the rationale underlying this statement).

These differences among the regional correlation vectors for the in-migration ratio are partly the result of unsystematic fluctuations due to the use of varying samples of observation. They may also indicate genuine regional differences regarding the complex of social and economic factors which is associated with inter-urban variation in the in-migration ratio. In other words, it is possible that the manner in which social and economic factors account for the inter-urban variation in the in-migration ratio differs systematically from one major region to another – there is a 'regional interaction' in the association between the factors and migration.

Further *partial* support for this view is indicated by Table 7.7. Table 7.7 shows that if a centre was located in the east the odds were six in 10 that it also fell into the lowest one third of the in-migration ratio values. If an area was located in the west, these odds fell to less than one in 10. For an area in the west the odds that its in-migration ratio was among the highest one third among the 102 values were eight in 10. An area in Ontario had five-in-10 odds of having an in-migration ratio value between the 33rd and 67th percentile values. The areas with higher ratios are clearly concentrated in the west, while those with the lower ratios are concentrated in the east. Table 7.7 also shows that the MAs and MUAs

Table 7.6 – Regional Variations in Correlation Coefficients Involving the In-Migration Ratio, Sub-groups of the 102 Urban Complexes of 10,000 and Over, Canada, 1956-61

Group factor name[a]	General[b]	East	Ontario	West	MA and MUA	Other
	Correlation coefficients[c]					
Tertiary specialization	0.40	0.22	0.14	0.45	0.19	0.51
Social heterogeneity ..	0.33	0.31	−0.13	−0.23	0.19	0.51
Income	0.17	0.19	0.06	−0.40	0.22	0.25
Modernity of economy ..	0.12	0.07	0.23	−0.04	0.36	0.16
Manufacturing specialization	−0.36	−0.39	−0.07	−0.35	−0.16	−0.36
Intensity of trading activity	0.36	0.54	−0.23	0.45	0.09	0.48
	Mean relation deviation from the general correlation vector[d]					
		4	11	14	7	5
	Standard error of the relative deviation[d]					
		1	2	3	1	1

[a] See Table 7.1, footnote [a].
[b] See Table 7.5, footnote [b].
[c] Each correlation coefficient pertains to the indicator variable of the group factor named in the row (see Table 7.1, footnote [f]) and to the in-migration ratio. (see Table 7.3, footnote *).
[d] See Table 7.5, footnote [a].

SOURCE: Appendix Table A.8.

had a lower percentage among high in-migration ratios than did the other centres. This differential between the MAs and MUAs on one hand and the other urban centres on the other hand is consistent with the data shown in Chapter Two (Table 2.5) for urban size groups. It may be due partly to the relatively larger population sizes of the MAs but probably also reflects the higher-than-average rates of out-migration from the other urban centres (Table 2.5). As noted in Chapter Two (footnote [6]), out-migration tends to increase the share of in-migrants within the 1961 population by depleting the base population.

In view of the emphasis placed (Chapter Four) on the 1961 Census statistics for Metropolitan Areas, it is of some interest to take a closer

Table 7.7 – Distributions of 102 Urban Complexes of 10,000 and Over, by Region and by Level of the Five-Year In-Migration Ratio, Canada, 1956-61

Region	In-migration ratio is:			A + B + C	Number
	Greater than the 67th percentile[a]	Between the 33rd and 67th percentiles[a]	Less than the 33rd percentile[a]		
	A	B	C	D	E
All regions[b]	32.4	35.3	32.4	100	102
East	10.8	32.4	56.8	100	37
Ontario	21.1	52.6	26.3	100	38
West	77.8	14.8	7.4	100	27
MA or MUA	15.4	43.6	41.0	100	37
Other	42.8	30.2	27.0	100	65

[a] The percentile values are as follows: 33rd percentile = 12.2; 67th percentile = 19.7. See Table 2.1, footnote[c], for definition of the in-migration ratio.

[b] See Table 7.5, footnote[b].

SOURCE: Same as Table 2.5.

look at the correlation coefficients for the 37 MAs and MUAs. Here it is found (Table 7.6) that only the indicator variable for modernity-of-economy factor is markedly correlated with the five-year in-migration ratio, the correlation being 0.36. Presumably, the other five indicator variables have such relatively similar values among the MAs and MUAs that they cannot do much to explain the inter-MA-MUA variation in the in-migration ratio.

Among the 37 MAs and MUAs, the multiple correlation between the group factor indicators and the in-migration is only 0.45, much below the value reported for all 102 centres. Among the 65 other centres, the corresponding multiple correlation coefficient is 0.69.[24] The corresponding values for the coefficient of prediction accuracy are 35 per cent and 52 per cent, respectively. The most important contributors to the multiple correlation among the MAs are the indicators of modernity of the economic structure (contributes over 60 per cent) and of income levels (contributes over 15 per cent). Among these areas, the in-migration ratio co-varies positively with four of the six indicators, the exceptional two being those for manufacturing specialization and intensity of trading activity. Such differences between these two groups of areas would lend some support to the idea that the factors that are causally interrelated with migration rates for the larger urban agglomerations in Canada differ from those involved when the smaller urban centres are considered.[25]

7.4 SUMMARY

It may be concluded, given the substantial acceptability of the chosen methods of analysis, that the basic expectations set forth at the outset of this Chapter are confirmed. The analysis indicates that the five-year in-migration ratio for an urban complex was significantly associated with its combination of relevant economic and social characteristics. The strength of association was only moderate, partly because a number of relevant non-economic factors were not controlled statistically before measurement of the above-mentioned association. However, the data do suggest that an urban complex that had higher-than-average values on the concentration of work force in tertiary industries, on per capita income levels, on per capita receipts from retail trade and services, and on the variety of socio-cultural groups in the population tended strongly toward relatively high values on the five-year in-migration ratio. In contrast, increases (from one urban complex to another) in manufacturing specialization were associated with *decreases* in the five-year in-migration ratio.

The degree and pattern of association tended to vary among meaningful sub-groups of the 102 urban complexes. For example, among 65 units that were neither MAs nor MUAs the indicator variables for the tertiary sector specialization and trading intensity factors make the largest contributions to measured multiple correlation. Among the MAs and MUAs the most important contributors to the multiple correlation are the indicator variables for income levels and modernity of economic structure. In general, the data indicate significant differentials among major regions of Canada in regard to the patterns of inter-correlation involving the selected indicators and the in-migration ratio. These findings are useful in the development of a framework for the analysis in Chapter Eight, which shows how well the 1951-61 net migration ratio is accounted for statistically by 1941-51 changes and 1951 levels of selected social, economic, demographic and geographical factors.

FOOTNOTES TO CHAPTER SEVEN

[1] Data on outflows are not available from the basic tabulations. Relevant comments on the nature of the in-migration ratio are found in Chapter Two, footnote [6]. The areal units used in the analysis are (a) Census Metropolitan Areas, (b) Census Major Urban Areas and (c) incorporated urban centres of 10,000 and over in 1961 which were not located within MAs or MUAs. The definitions of the MAs are indicated in Stone, 1967, Appendix D. These units are referred to as "urban complexes", for the sake of convenience (for related comments see Stone, 1967, Chapter Six and Appendix E).

[2] It should be emphasized that "influence" is not being used synonymously with "explain fully". Furthermore, an influence which is exerted may not be evident because of other counteracting influences.

[3] Even where a single causal mechanism is postulated and a corresponding theoretical model is formulated, the choice of indicators is essentially arbitrary in some degree.

[4] Most of the so-called 'econometric models' of migration also follow this approach in the sense that they include demographic and geographic variables, such as simple transformations of the population potential. The use of the population potential stems from the so-called gravity 'models', and this variable often turns out to do the bulk of the statistical accounting accomplished by the econometric model. See, for example, Lowry, 1966, Rogers, 1967, and Kono and Shio, 1966.

[5] Any serious attempt to add the existing theoretical literature goes beyond the scope of this monograph.

[6] This list of factors is obviously not exhaustive.

[7] The heterogeneity of an aggregate is defined with respect to a specific set of categories. Maximum heterogeneity is observed when the aggregate is evenly distributed over the specified categories. Speaking loosely, social heterogeneity of a population refers to the extent to which the population is evenly distributed among a variety of socio-cultural groups.

[8] This assumption is, of course, controversial. Basically, it rests on the idea that the concentration of economic opportunities at a centre tends to be associated with the generation of demand for a variety of occupational skills at that centre; and that the meeting of this demand, in the short run at least, usually entails the attraction of persons in a variety of social groups and cultural heritages. This attraction in turn is likely to make the prospect of life at that centre more exciting for the most individuals. There is no evidence in proof of these propositions, so they merely represent opinions.

[9] The choice of an indicator is inevitably arbitrary in some degree. In terms of the theory of image analysis, which provides the mathematical rationale for the concept of *group factor* as used in this monograph, the indicator should be a linear combination of the variables contained in the sub-group. However, for the limited purposes of this study, one variable from within the sub-group is chosen as indicator. The reasons for this decision, and related discussion, are provided in Appendix D.

Either the above-mentioned linear combination or a single indicator variable (as is used here) gives rise to some anomalies, essentially because some information loss is usually involved in the transformation from a multi-dimensional space to a uni-dimensional one; but this tendency is probably greater with a single indicator variable. The use of variables as factor indicators also appears in a recent article by Sawyer, 1967, and is referred to in an early piece by Cattell, 1944.

[10] It is a deliberate postulate of this study that the group factors are correlated, in the belief that events in the real world support this postulate better than they support that of independent group factors (for further comment see Appendix D). Of course, either postulation may well be treated as an axiom, because the existence of underlying factors *in the real world* cannot be demonstrated beyond

reasonable doubt. Such postulation is best justified, in the writer's view, on the grounds that it provides a rationale for the synthesis of large masses of varied data and for the simplified discussion of the findings from a multivariate analysis. This is a useful provision, because it is practically impossible to communicate effectively in the normal language of human discourse the myriad inter-variable relations which are considered in a multivariate analysis.

One of the propositions implied by the second statement of the preceding paragraph is that if there are underlying factors *in the real world* we cannot actually verify their number beyond reasonable doubt. Basically the choice of a number is arbitrary (it is even conceivable that there are more factors *in the real world* than variables included in a particular analysis), and is guided largely by the aim of simplifying the discussion of the findings of the multivariate analysis.

[11] There is "relative similarity" in a group when the members of the group resemble each other more closely than they do non-members. Thus there may be *relative* similarity even if there are marked absolute dissimilarities among the members; which explains the reason why the phrase "best available grouping" is used rather than "best grouping".

[12] As Harman, 1960, p. 130, suggests, the reasonableness of the grouping, in terms of the identities of the variables grouped, should also be considered before the results of grouping are accepted as effective. It is worth noting that there is no sampling model that may be invoked to legitimately test the statistical significance of B-coefficients from the correlation coefficients used to *create* the groups.

[13] In a more refined analysis, the correlation coefficient between two sets of variables would be used. However, the average of the pair-wise coefficients should be sufficiently useful here because of the high degree of multicolinearity within each group of variables (cf. Farrar and Glauber, 1966).

[14] It should be noted that no emphasis is placed on statistical coefficients whose meanings become unduly ambiguous as a result of these inter-correlations. Specifically, there is no emphasis placed on partial regression slopes (see Appendix D for related discussion).

[15] The techniques used in this Chapter are common in the fields of psychometrics and sociometrics, particularly in their use of principles from factor analysis and related subjects, and so are not likely to be very familiar to readers who have not been exposed to these techniques. Therefore, it seems advisable to indicate why the analysis has not been cast in the mould of an exercise in the specification and testing of a regression model.

In this kind of exercise, primary emphasis is placed on the directions and relative sizes of the partial regression slopes. Such emphasis is not justified when there are significant levels of inter-correlation among the 'independent' variables, because as this inter-correlation increases the values of the regression slopes become more and more indeterminate (and thus devoid of unambiguous substantive meaning). As Farrar and Glauber, 1966, note, this phenomenon of multicollinearity can seriously disturb the values of the regression slopes even when the above-mentioned inter-correlations seem to be of a low order of magnitude. Even when the 'independent' variables are uncorrelated, a precise comparison of the relative sizes of the partial regression slopes is risky if these variables do not have a multivariate normal distribution (Bogue and Harris, 1954, p. 16).

Also important is the fact that the values of the regression slopes depend on (a) the specific list of variables chosen as 'independent' and (b) correlations between the chosen independent variables and variables which are *not* included in the analysis. Because of the latter condition, it is necessary to note that the influences attributed to a chosen 'independent' variable may well involve the influences of several other variables (not included in the analysis) which are correlated with the one chosen. In short, the conditions required for adequate estimation of the structure of a regression model are not met in these statistics.

Finally, firm interpretation of the partial regression slopes rests largely on the assumption that the 'independent' variables are uncorrelated. The very opposite of this assumption has been postulated as a basic axiom upon which the design of this Chapter is built.

[16] Had the aggregate in-migration been used as the 'dependent' variable rather than the in-migration ratio, the multiple correlation would have been 0.46. The aggregate in-migration is not used in the discussion because it is the writer's aim to analyse the impact of the migration on population size (the aggregate of migration *relative* to the size of the area's population) rather than the sheer volume of migration.

It is important to note that, from the viewpoint of demographic interpretation, the in-migration ratio is more than a mere mathematical transformation of the volume of in-migration. The in-migration ratio is the proportion (expressed on a percentage basis) which the five-year in-migrants bear to the 1961 population; thus it reflects the relative impact of the five-year in-migration upon the size of the 1961 population. This impact of the five-year in-migration on population size is the variable of interest and not the sheer flow of in-migrants, although the two variables are correlated.

This interest in the former of the two variables is motivated by the assumption that it has great practical significance. It is assumed that a community that is interested in attracting migrants usually is particularly concerned as to whether they will get enough migrants to make a significant impact on their population growth rate or composition. This comment applies particularly to the *net* migration ratio, which directly reflects (at least by a simple transformation) the contribution of migration to the growth *rate* of population.

[17] The squared multiple correlation coefficient (the 28 per cent figure mentioned above) pertains directly to the degree of accuracy in predicting the *variance* of the in-migration ratio over all areas from the variance of its linear regression estimate (in which the selected indices are 'independent' variables). Here the focus is on the prediction of the *level* of the net migration ratio in a *specific area* based on the knowledge of its values on the selected indices, and (as shown in Appendix F, Section F.2) the coefficient of prediction accuracy is the more appropriate measure for this purpose. The general problem, as set forth in Section 7.1, concerns the extent to which the socio-economic conditions in an urban complex are associated with its in-migration ratio. Although the answer to this question influences the degree of success in predicting the variance of the in-migration ratio over all areas, the prediction of the level of the net migration ratio in a given urban complex is more relevant to the general problem (see Appendix F, Section F.2).

[18] Perhaps some index of areal variation in age distribution would be helpful.

[19] Of course, this discussion may place the socio-economic indicators at a disadvantage as 'predictors' of areal variation in migration rates, as a result of its exclusion of a measure of the rate of unemployment. Unemployment was excluded because of the well known defects in the census measurement of unemployment (cf. Denton and Ostry, 1967, pp. 8-10), which might have been particularly serious for the smaller urban complexes. In addition, it is likely that much of the explanatory power of the unemployment rate (as measured from the 1961 Census statistics) is probably reflected in the earnings measure included in this study (see variable x_5 in Table 7.1).

[20] For the reasons given in footnote [15], the citation of the actual values of regression slopes in the text or tables is avoided, as is substantive interpretation of these values. It is assumed here that the indicated direction (positive or negative) of a slope is valid when the actual value is much larger than its standard error.

For those readers who are mainly familiar with regression analysis the data will be shown in footnotes, however. In this case the general regression equation is:

$$Y = a_0 + a_1\ x_2 + a_5\ x_5 + a_6\ x_6 + a_8\ x_8 + a_{10}\ x_{10} + a_{13}\ x_{13}.$$

This turns out to be:

$$Y = 0.08 + 0.16x_2 + 0.08x_5 - 0.06x_6 - 0.12x_8 + 0.52x_{10} + 0.14x_{13}.$$

The standard errors of the regression constant and slopes are *0.05, 0.12, 0.08, 0.38, 0.06, 0.30* and *0.13*, respectively.

[21] It should be noted, however, that a positive partial regression slope would have been shown had the total number of in-migrants (rather than the in-migration *ratio)* been the subject of analysis. This comment also applies to the indicator of the degree of modernity in the economic structure. It should be recalled, however, that the number of in-migrants and the in-migration ratio (while related) should not be treated as substitutes (see footnote [16]).

[22] To make this statement applicable to the manufacturing variable, it may be considered that its low values are high values of 'non-manufacturing' and that it is these high values to which the statement refers.

[23] In their research on correlates of growth rate differentials among Canadian urban centres, Hodge, 1967, and King, 1967, also indicate findings concerning regional variation in patterns of inter-correlation.

[24] If the total number of in-migrants had been the dependent variable, the multiple correlation coefficients would have been 0.72 and 0.58, respectively. Among the MAs and MUAs, more than 50 per cent of the variance in the *volume* of in-migration is accounted for statistically by the selected socio-economic indicators.

[25] The following data illustrate clearly the importance of specifying the relevant areal units within the formulation of a theoretical model for the explanation of migration differentials, when this model is later 'tested' through regression analysis. For the 37 MAs and MUAs, the estimation of the regression equation indicated in footnote [20] is:

$$Y = 0.07 + 0.07x_2 + 0.04x_5 + 0.64x_6 - 0.05x_8 + 0.02x_{10} - 0.09x_{13}.$$

For the additional 65 urban centres the result is:

$$Y = -0.01 + 0.30x_2 + 0.13x_5 - 0.01x_6 - 0.07x_8 + 0.91x_{10} + 0.20x_{13}.$$

The ratio of each regression slope to its standard error is as follows:

Variables	MAs and MUAs	Others
x_2	0.69	1.94
x_5	0.50	1.32
x_6	1.82	− 0.02
x_8	− 0.91	− 0.86
x_{10}	0.06	2.37
x_{13}	− 0.71	1.17

Chapter Eight

SOCIO-ECONOMIC CORRELATES OF THE TEN-YEAR NET MIGRATION RATIO, FOR URBAN COMPLEXES AND COUNTIES, 1951 - 61

8.1 PURPOSE

The preceding Chapter has considered economic and social correlates of areal variation in regard to migration ratios from the standpoint of the values of economic and social indicators at the *end* of the migration period. Thus the values of the indicators probably reflected consequences, as well as possible determinants, of the migration pattern. In order to strengthen the basis for developing interpretations concerning the determinants of areal variation in migration ratios, this Chapter treats values of selected indicators measured at the *beginning* of the migration period. For this purpose it is necessary to focus upon the variation of the 1951 - 61 net migration ratio[1] among the urban complexes. A supplementary analysis is made for the variation of this ratio among the counties or census divisions. The immediate aim of this Chapter is to measure and interpret the degree and pattern of association of the 1951 - 61 net migration ratio with selected economic and social factors in the preceding 1941 - 51 period.[2] It is hoped that the discussion might contribute in a small way to the development of systematic causal interpretations of areal migration differentials in Canada.

The discussion is guided by a particular interest in gauging the extent to which the selected data are consistent with those causal interpretations, of the areal variation in the 1951 - 61 net migration ratio, that give a prominent role to economic factors. It is understood the data may not support a particular causal interpretation because they confound the effects of several different processes, some of which are mutually counteracting. In this instance, the data might still be useful in suggesting the likely degree and pattern of the net influence (that which is effective despite counteracting forces) of the processes considered in the relevant causal interpretations.

Although the analysis is guided by an interest in causal interpretations that give a prominent role to economic factors, no specific economic model is set up as an explanation of areal variation in net migration ratios. The discussions in Section 7.2.1 of Chapter Seven and in Appendix H present some general stipulations for a procedure which would take into account the contributions of several different processes (requiring different models) to the total number of migrants entering and leaving an area. In the light of these stipulations, a fairly diverse set of variables (intended to reflect the influences of diverse causal mechanisms) is chosen for analysis. The choice of variables has been guided by the findings and theoretical discussion in the literature on related research (see Chapter Seven, Section 7.2.1 for further details and references).

8.2 PROCEDURE FOR URBAN COMPLEXES

The techniques used in this Chapter are generally the same as those used in Chapter Seven. The reader should consult Sections 7.2 and 7.3, and Appendices D and E for the relevant explanatory comments concerning techniques, as his familiarity with these explanations will be assumed in the following discussion.

Table 8.1 lists the 16 variables chosen for the treatment of urban complexes. Three clusters and three ungrouped variables have been identified, using the algorithm described roughly in Appendix D. As in Chapter Seven, each sub-group of variables comprises a group factor. The first group factor name shown, "metropolitan status", refers generally to the extent to which the economy of an urban complex is focused upon the performance of economic functions (notably the supply of goods and services) for *other* urban centres. The centre that is high in metropolitan status is a prominent node in the flows of goods, services and communication among regions of the national economy. Such a centre would have a relatively high per capita income level, marked concentration of working force in newer tertiary activities, and prominent values on the per capita receipts from wholesale sales and service trades.

The second group factor name, "working force skill structure", refers generally to the extent to which the working force is concentrated in occupations requiring higher-level skills. These occupations would fall particularly into the professional and technical group, and the centres with prominent values on this factor may be expected to have populations that are highly educated relative to other centres.

The third group factor is called "accessibility", The more highly accessible centres are those that tend to be larger than average and to be MAs themselves or be close to an MA.

Table 8.1 – List of Variables for the Analysis of the 1951-61 Net Migration Ratio for Urban Complexes, Canada

Group factor name[a]		Definitions of the variables
Net migration rate	Y^b	= 1951-61 crude net migration ratio[c]
Metropolitan status	X_1*	= 1951 proportion of the population which was born outside Canada
	X_3	= Proportion earning at least $3,000 in the year preceding the 1951 Census, among male wage earners[d]
	X_5	= 1951 wholesale sales per capita[e]
	X_6	= 1951 service trade receipts per capita[e]
	X_8	= 1951 infant mortality rate[f]
	X_{11}	= 1951 proportion in clerical occupations among females in the labour force
Working force skill structure	X_9	= 1951 proportion of the male labour force in professional and technical occupations
	X_{17}	= 1951 proportion of the male labour force in public administration
	X_{23}*	= 1951 proportion with 13 or more years of schooling among males aged five and over who were not attending school[g]
	X_{24}	= 1951 female labour force participation rate[h]
Accessibility	X_{10}	= 1941-51 percentage change in the proportion of the male labour force in professional and technical occupations[i]
	X_{19}*	= Distance in miles to nearest Census Metropolitan Area
	X_{21}	= 1951 population size
Manufacturing specialization	X_{13}	= 1951 proportion of the male labour force in manufacturing
Demographic growth	X_{22}	= 1941-51 growth rate in population[j]
Employment opportunity growth[k]	X_{25}	= 1941-51 relative change in proportion of male wage-earners who worked 50 or more weeks during the year preceding the Census[l]

Footnotes on following page.

[a] See Table 7.1, footnote [a].

[b] See Table 7.1, footnote [b].

[c] This ratio is based on the vital statistics estimate, described in Table 2.4, footnote [b]. The estimate refers to persons of all ages (hence the use of the term "crude". Adjustments of the basic population and vital statistics were made in order to provide estimates for constant boundaries in the cases of centres that had annexations over the 1951 - 61 intercensal period.

[d] See Table 7.1, footnote [c].

[e] See Table 7.1, footnote [g]. The comment in that footnote also applies to the service receipts data for 1951.

[f] Infant mortality rate = infant deaths in the calendar year divided by births in that period.

[g] See Table 7.1, footnote [g]. The 1951 data are in terms of the numbers of years of schooling attained.

[h] See variable X_3 in Table 7.1.

[i] Let P_0 and P_1 be the 1951 and 1961 proportions, respectively. The percentage change is defined as $100\ (P_1 - P_0)/P_0$.

[j] Let P_0 and P_1 be the 1941 and 1951 populations, respectively. The growth rate is defined as $(P_1 - P_0)/P_0$.

[k] For any single area, this variable X_{25} is probably a poor measure of true employment opportunity growth since this growth can fluctuate markedly over periods very much shorter than ten years in length. However, the name is chosen on the assumption that the variable reflects to some extent the areal variation in employment opportunity growth over the 1941 - 51 decade.

[l] Using P_0 and P_1 as defined in footnote [i], the relative change is defined as $(P_1 - P_0)/(1 - P_0)$ if $P_1 > P_0$ or $(P_1 - P_0)/P_0$ if $P_1 \leq P_0$.

It is a measure that relates the actual amount of change $(P_1 - P_0)$ to the maximum possible amount in the observed direction of the change.

* Indicates the variable chosen as the group factor indicator (see Chapter Seven, Section 7.2 and Appendix E, Section E.1.) Generally, the variable having the maximum sum of correlations (absolute values) with other variables within the group was chosen as the indicator. Where the group has only two members, the variable having the highest correlation with the in-migration ratio was chosen as the indicator.

The three ungrouped variables are considered as representing, respectively, manufacturing specialization, demographic growth and employment opportunity growth. More detailed discussion on the definition and naming of these group factors is presented in Appendix E.

The identified subdivision of the 16 variables into six[3] groups is the best available 'six-grouping' of these variables, in the sense indicated in Chapter Seven (Section 7.2.2). In addition, the test with Holzinger's B-coefficient (see Section 7.2.2) indicates that the grouping is effective. The B-coefficients for the three clusters are as follows:

Name	Number of variables	B—coefficient
Metropolitan status	6	282
Working force skill structure	4	168
Accessibility	3	135

The pattern of average correlations among the groups is reasonable, as Table 8.2 shows. As one might expect, marked positive level of correlation is shown between metropolitan status and working force skill structure (see footnotes [14] and [15] to Chapter Seven). These factors are negatively correlated with specialization of the working force in manufacturing, and are positively associated with the growth in employment opportunity.

Table 8.2 – Average Product-Moment Correlation Coefficients Among Variable Clusters for 63 Urban Complexes[a] of 10,000 and Over in 1941, Canada, 1941-51

Group factor name[b]	Metropolitan status	Working force skill structure	Accessibility	Manufacturing specialization	Demographic growth	Employment opportunity growth
Metropolitan status	–	0.23	0.14	0.25[c]	0.09	0.12
Working force skill structure	0.23	–	0.17	0.22[c]	0.08	0.12
Accessibility	0.14	0.17	–	0.13[c]	0.08	0.06
Manufacturing specialization	0.25[c]	0.22[c]	0.13[c]	–	0.19	0.20
Demographic growth ...	0.09	0.08	0.08	0.19	–	0.11[c]
Employment opportunity growth	0.12	0.12	0.06	0.20	0.11[c]	–

[a] See Table 7.2, footnote[a].
[b] See Chapter Seven, Section 7.2, Appendices D and E, and Table 8.1.
[c] Almost all (if not all) of the averaged correlations have negative signs. The averages are calculated from the absolute values of the coefficients.

SOURCE: Appendix Table A.9.

8.3 FINDINGS FOR URBAN COMPLEXES

Although the group factor indexes exclude 1951 - 61 changes, they are systematically associated with the 1951 - 61 net migration ratio. Among the 63 urban complexes of 10,000 and over in 1941, coefficient of multiple correlation between these indexes and the 1951 - 61 net migration ratio is 0.70. If the 63 urban complexes comprised a sample drawn from a universe in which the true multiple correlation was zero, a sample correlation as high as 0.70 would be extremely unlikely; the probability of observing a coefficient as high as 0.70 would be at most 0.02 (see Appendix F).[4]

The strength of the association is moderate since the linear regression of the indicator variables statistically explains 49 per cent of the variance in the net migration ratio. The coefficient of prediction accuracy (Appendix F, Section F.2) is 51 per cent, so that, given an urban centre's combination of values on the six indicator variables, its value on the net migration ratio could be predicted with 51 per cent (out of a possible 100 per cent) accuracy. The reasons for a modest strength of association which were indicated in Chapter Seven (Section 7.3) may also apply here, although with diminished force since the net migration ratio should be less sensitive to 'life-cycle migration' than the in-migration ratio. As pointed out in Section 8.1, the reasons must include the fact that the present analysis ignores relevant factors which were unique to the 1951 - 61 period, since the indicator values were measured at the beginning of the migration period (see footnote[2]).

Among the indicator variables, that which stands for the metropolitan status factor is by far the most important in accounting for the systematic association with the 1951 - 61 net migration ratio. Almost one half of the multiple correlation may be attributed to this variable alone (see Table 8.3). The second most important factor is the 1941 - 51 demographic growth,[5] to which may be attributed roughly 25 per cent of the multiple correlation. Among the remaining four variables, only manufacturing specialization and the indicator of working force skill structure contribute nearly 10 per cent of the multiple correlation.

The 1951 - 61 net migration ratio varied positively with five of the six group factors (see Table 8.3 and footnote[4]), the exceptional one being manufacturing specialization. The increases from one urban centre to another in the variable reflecting the performance of metropolitan functions, in the proximity to Census Metropolitan Areas, in the levels of skill in the working force, and in demographic and employment opportunity growth for the 1941 - 51 decade were associated with increases in the 1951 - 61 net migration ratio. The highest correlations with the 1951 - 61 net migration ratio are shown by the metropolitan status indicator, with a zero-order coefficient of 0.53 and a third-order partial correlation coefficient of 0.47.

Thus the metropolitan status indicator, if used alone in the analysis, would reflect much of the influence of the other five variables.

Table 8.3 – Measures of Association Between Group Factor Indicators and the Net Migration Ratio[a] for 63 Urban Complexes of 10,000 and Over in 1941, Canada, 1951-61

Group factor name	Range of zero order correlation coefficients[b]	Zero order correlation coefficient with index variable[c]	Third order partial correlation coefficient with index variable[d]	Relative importance in multiple correlation[e]
				%
Metropolitan status	– 0.42 to 0.57	0.53	0.47	46
Manufacturing specialization	– 0.17	– 0.17	– 0.24	11
Accessibility	– 0.24 to 0.24	0.24[f]	0.18[f]	6
Demographic growth rate	0.40	0.40	0.37	25
Working force skill structure	0.20 to 0.30	0.30	0.19	9
Employment opportunity growth	0.16	0.16	0.13	3

[a] See Table 8.1, footnotes [a] and [c].
[b] See Table 7.3, footnote [b].
[c] See Table 7.3, footnote [c]. In this case the migration variable refers to *net* migration. See also Table 7.3, footnote [f].
[d] See Table 7.3, footnote [d]. For the first, third, fourth and fifth rows the variables held constant are three of X_1, X_{19}, X_{22} and X_{23}; the fourth being the index variable being correlated with the net migration ratio. For the second and sixth rows, the variables held constant are X_1, X_{22} and X_{23} (see Table 8.1).
[e] See Appendix D for explanation.
[f] The index variable is X_{19} (see Table 8.1), which refers to distance from the nearest Census Metropolitan Area. This coefficient may thus be interpreted as a *positive* correlation with proximity to the nearest MA.

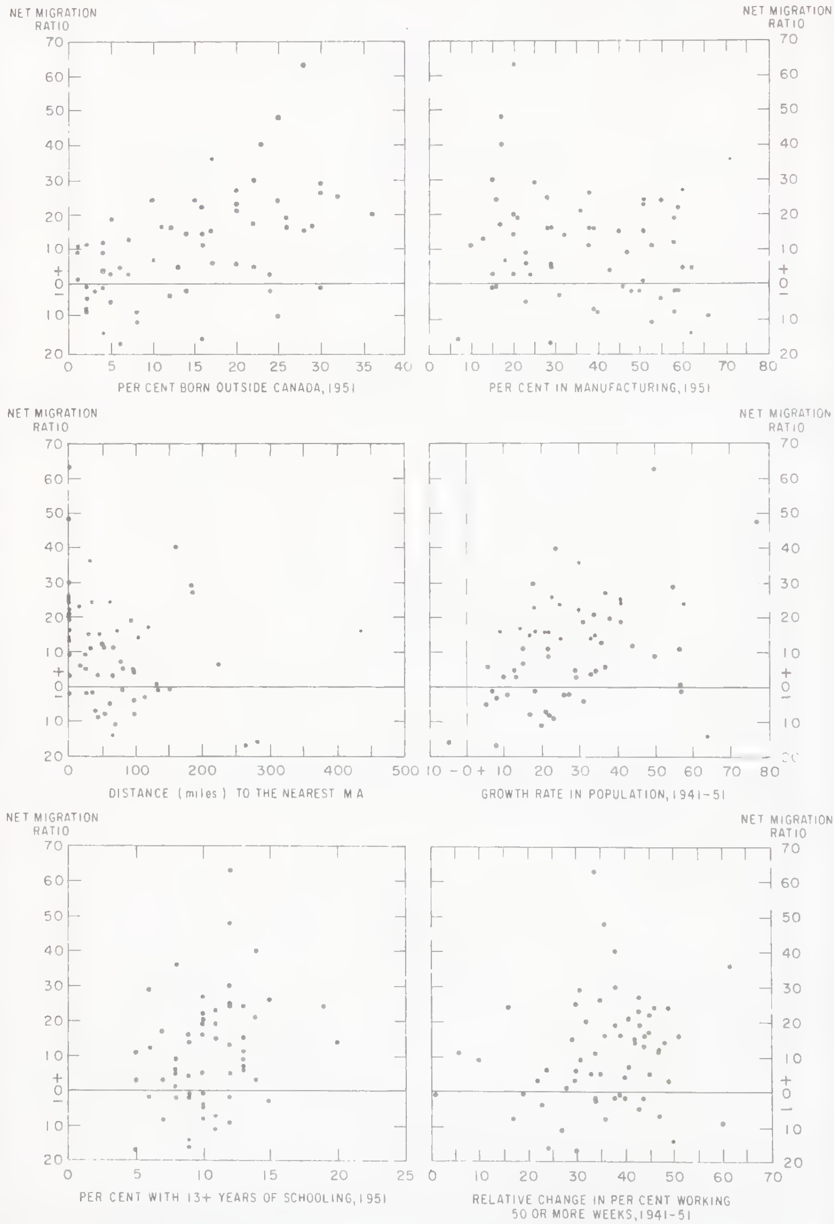
SOURCE: Appendix Table A.9.

Manufacturing specialization varied *inversely* with the level of the 1951-61 net migration ratio for the urban complexes. Both the zero-order and third-order partial correlation coefficients are negative (–0.2 in each case, as Table 8.3 shows). The negative partial regression slope is substantial in relation to its standard error (see footnote[4]). Thus, increases over urban complexes in the index of manufacturing specialization as of 1951 were associated with *decreases* in the level of the 1951-61 net migration ratio. Chart 8.1 shows the scatter diagrams for the association between individual indicators and the 1951-61 net migration ratio.

Table 8.4 provides further observations of the systematic association between the indicators and the 1951-61 net migration ratio. Urban centres which simultaneously have values above the median on the four selected

CHART—8.1

SCATTER DIAGRAMS SHOWING ASSOCIATION BETWEEN 'GROUP FACTOR' INDICATORS AND THE NET MIGRATION RATIO, FOR 63 URBAN COMPLEXES OF 10,000 AND OVER IN 1941, CANADA, 1951—61



Source: Same as Appendix Table A 9.

Table 8.4 – Joint Distribution[a] of the Urban Complexes of 10,000 and Over[b] in 1941 Among Levels of the Group Factor[c] Indexes and of the Net Migration Ratio, Canada, 1951-61

Item	Working force skill structure indicator above median[d]				Working force skill structure indicator below median			
	Demographic growth indicator above median		Demographic growth indicator below median		Demographic growth indicator above median		Demographic growth indicator below median	
	Accessibility indicator above median[e]	Accessibility indicator below median	Accessibility indicator above median	Accessibility indicator below median	Accessibility indicator above median	Accessibility indicator below median	Accessibility indicator above median	Accessibility indicator below median
	A	B	C	D	E	F	G	H
Metropolitan status indicator above median –								
Net migration ratio above 67th percentile[f]	0.82	0.58	0.40	0.48	0.63	0.42	0.33	0.42
Net migration ratio between 33rd and 67th percentiles	0.16	0.39	0.35	0.33	0.19	0.43	0.25	0.25
Net migration ratio below 33rd percentile	0.02	0.02	0.25	0.19	0.18	0.15	0.42	0.33
	I	J	K	L	M	N	O	P
Metropolitan status indicator below median –								
Net migration ratio above 67th percentile	0.23	0.10	0.04	0.04	0.10	0.04	0.03	0.03
Net migration ratio between 33rd and 67th percentiles	0.65	0.78	0.53	0.37	0.44	0.49	0.34	0.21
Net migration ratio below 33rd percentile	0.12	0.13	0.43	0.58	0.46	0.47	0.63	0.76

[a] See the explanation in Table 7.4, footnote [a].
[b] The number of urban complexes is 63. See Table 7.2, footnote [a].
[c] See Table 7.1, footnotes [a] and [b], and Appendices D and E.
[d] See Table 7.4, footnote [d].
[e] The indicator refers to the mileage between the urban complex and the nearest Census Metropolitan Area. The designation "above median" refers to the cases which fall among the *lower* one half of the values on this mileage – cases which have relatively *high proximity* to the nearest CMA. These cases include the CMAs themselves.
[f] See Table 7.4, footnote [e].

SOURCE: Appendix Table A.9.

indicators are heavily concentrated in the highest third of the net migration ratio values. At least 80 per cent of these areas have net migration ratios above the 67th percentile value. In sharp contrast, only three per cent have net migration ratios above this percentile among centres which simultaneously have values below the median on the four group factor indicators. Instead, the latter areas are heavily concentrated among the lowest third of the values on the 1951 - 61 net migration ratio.

In sum, the data appear to confirm the expectation of a systematic pattern and marked degree of association between inter-urban variation in socio-economic characteristics measured at the beginning of the 1951 - 61 decade and that in the net migration ratio for this decade. Generally, the net migration ratio varied positively with the indicators for the factors of metropolitan status, 1941 - 51 demographic growth, accessibility, and skill structure of the working force. These findings may be further explored in two major sub-groupings of the 63 urban complexes.

8.3.1 'METROPOLITAN' VERSUS OTHER URBAN COMPLEXES – The 63 urban complexes were subdivided into two groups: (1) MAs and MUAs, and (2) other centres (see Chapter Seven footnote[1]). The inter-correlation matrices for these two groups differ significantly both from the *general* correlation matrix for all 63 units and from each other (Table 8.5), for the same reason as that indicated in Section 7.3.2. Generally higher and still

Table 8.5 – Measures of Deviation Between Correlation Matrices[a] for Sub-groupings of the 63 Urban Complexes of 10,000 and Over in 1941, Canada, 1951 - 61

Correlation matrices			Correlation vectors involving the net migration ratio		
MAs and MUAs[b] vs all 63 units	Others vs all 63 units	MAs and MUAs vs others	MAs and MUAs vs all 63 units	Others vs all 63 units	MAs and MUAs vs others
Mean relative deviation					
4	8	12	4	13	15
Standard error of relative deviation					
0	0	0	1	2	2

[a] See Table 7.5, footnote [a].
[b] See Table 7.5, footnote [b].

SOURCE: Appendix Table A.9.

significant differentials are observed when only those correlations involving the net migration ratio are considered. These findings suggest significant differences between the larger urban complexes and the smaller ones in regard to the pattern of inter-correlations among factors related to 1951 - 61 net migration ratio.

Table 8.6 shows that the MAs or MUAs were much more likely to have high net migration ratios than were the other centres. Close to 50 per cent of the MAs or MUAs have net migration values above the 67th percentile, while the corresponding percentage for the other centres is eight per cent. Nearly one half of these other centres have net migration ratio values below the 33rd percentile. In addition, the areas with net migration ratios above the 67th percentile value are predominantly MAs or MUAs, as the MAs or MUAs in this category outnumber the other areas by a margin of nine to one.

Table 8.6 – Distributions for Two Sub-groups of Urban Complexes Among Levels of the Net Migration Ratio, Canada, 1951 - 61

Area	Net migration ratio —			A + B + C	Number
	Greater than the 67th percentile[a]	Between the 33rd and 67th percentiles[a]	Less than the 33rd percentile[a]		
	A	B	C	D	E
All urban complexes ..	31.7	36.5	31.7	100	63
MAs and MUAs[b]	47.4	31.6	21.0	100	38
Others[b]	8.0	44.0	48.0	100	25

[a] The percentile values are as follows: 33rd percentile = 3.0; 67th percentile = 16.1. See Table 8.1, footnote [c] for definition of the net migration ratio. The data for MAs are obtained directly from 1961 Census, DBS 99 - 512, Table X. For MUAs (and for MAs not included in the above-mentioned source) the estimates were prepared according to the technique described in Stone, 1967, Appendix F. This technique allows the estimates to reflect migration to built-up areas adjacent to the central incorporated centre of the MUA. For other centres the estimates refer to the incorporated boundaries of the centres, with adjustments (of the basic vital and population statistics) being made to provide estimates for a constant area when a centre was affected by boundary changes.

[b] See Table 7.5, footnote [b].

SOURCES: 1961 Census, DBS 99 - 512, Table X; 1961 Census, DBS 99 - 510; 1961 Census, DBS 92 - 535, Tables 9 and 10. DBS, *Vital Statistics* (annual), 1951 to 1961.

Among the 38 MAs or MUAs[6] the multiple correlation between the indicator variables and the 1951 - 61 net migration ratio is 0.76, so that nearly 60 per cent of the variance in this ratio is accounted for by the

indicators.[7] The coefficient of prediction accuracy is 55 per cent. Both the pattern and the degree of association between the 1951-61 net migration ratio and the selected economic and social factors are sharper among the MAs or MUAs than among all 63 urban complexes. The patterns of co-variation between the individual group-factor indexes and the 1951-61 net migration ratio are roughly the same for the MAs or MUAs as for all 63 urban complexes (see Table 8.7).

Table 8.7 – Measures of Association Between Group Factor Indicators and the Net Migration Ratio[a] for 38 MAs and MUAs, Canada, 1951-61

Group factor name	Range of zero order correlation coefficients[b]	Zero order correlation coefficient with index variable[c]	Third order partial correlation coefficient with index variable[d]	Relative importance in multiple correlation[e]
				%
Metropolitan status	– 0.57 to 0.64	0.57	0.53	46
Manufacturing specialization	– 0.21	– 0.21	– 0.24	9
Accessibility	0.15 to 0.31	0.31[f]	0.16[f]	6
Demographic growth rate	0.34	0.34	0.35	14
Working force skill structure	0.22 to 0.45	0.45	0.29	19
Employment opportunity growth	0.19	0.19	0.19	6

[a] See Table 8.1, footnotes[a] and [c].
[b] See Table 7.3, footnote[b].
[c] See Table 8.3, footnote[c].
[d] See Table 8.3, footnote[d].
[e] See Appendix D, Section D.3 for explanation.
[f] See Table 8.3, footnote[f].

SOURCE: Appendix Table A.9.

8.3.2 **INTERPRETATION** – If the inter-urban differentials in the 1951-61 net migration ratio were caused primarily by economic factors, the foregoing discussion provides some support for interpretations as to the part played by the economic factors over the 1941-51 decade. This was a decade of rapid modernization of the Canadian economic structure (cf. Wilson, Gordon and Judek, 1965, pp. 261-266). The basic economic structural changes were probably concentrated heavily in the metropolitan areas and the other larger urban complexes with good access to metropolitan areas. The metropolitan areas and their nearby larger urban complexes had relatively high levels of specialization in the rapidly expanding sectors, at least from the viewpoint of labour demand expansion. Thus, the metropolitan areas and their nearby

urban complexes had markedly increased shares of the economic forces that tend to attract migrants. Movers starting in such areas tended to choose a new residence within such areas to a greater extent than movers starting elsewhere, while those leaving other centres tended to show significantly high response to the strong attractions of the metropolitan centres. Thus, the net shift in population size due to migration tended to favour the metropolitan areas strongly, even after their relatively large population sizes were taken into account. Thus, in general, the metropolitan areas and their nearby urban complexes were the major spatial 'growth poles' in the national economy (at least from the viewpoint of labour demand) in the period of and since the Second World War, and this was a major reason why they attracted and retained migrants to a significantly high degree in the 1951 - 61 decade. In short, considering the intercorrelations among the factors of metropolitan status, accessibility and working force skill structure, it may be suggested that there was a convergence of economic changes concentrated in the metropolitan and nearby urban complexes, and that this concentration was a major factor causing the relatively high levels of the 1951 - 61 net migration ratio among the MAs and MUAs. The idea of *a convergence of economic changes* concentrated in particular population agglomerations is to be stressed here in favour of emphasis on any single economic factor operating independently of others. The attractiveness of an urban centre should be built up along a wide front, including attention to the educational level and 'skill structure' of the working force, to the improvement of accessibility to major centres, and to the building up of the local infrastructure of community and business services, among other factors.

8.4 PROCEDURE FOR COUNTIES OR CENSUS DIVISIONS

The findings reported in the previous Sections of this Chapter depend partly on the chosen areal units of observation – urban complexes with 1941 populations of at least 10,000. Thus, it is of some interest to ascertain whether a different and still partly useful set of units will yield a similarly systematic pattern of association between the 1951 - 61 net migration ratio and the selected economic and social variables measured in 1951. Counties and census divisions are the only units of observation for which the requisite data are available and which are sufficiently numerous for the techniques of statistical analysis being used here. The boundaries of the counties or census divisions usually extend well beyond those of the urban complexes used in the preceding Sections, so that, although arbitrary, they may roughly approximate some 'zones of influence' of major urban agglomerations.

The choice of county or census division units has not been limited to those that are predominantly urban. Thus, a much wider variety of Canadian

communities will be reflected in the data than was the case with the urban complexes. For this reason, the network of social and economic factors which may underlie inter-county (or census division) net migration variation may be different from that which is behind this variation among the urban complexes. Instead of carrying over to the county or census division level the factors and indicator variables used in the foregoing analysis for urban complexes, it is therefore appropriate to find new clusters of the social and economic variables for the analysis of the county or census division data. A new grouping of the selected social and economic variables is also prompted by the fact that some of the relevant statistics which are available for the urban complexes are not provided for the counties or census divisions[8] and *vice versa*. Given a somewhat different selection of variables and a new grouping for the counties or census divisions, as compared with the foregoing analysis for urban complexes, direct comparisons may not be made of correlation coefficients between the data in the preceding Sections and those that follow, although they still deal with the broad question as to whether the areal variation in the 1951 - 61 migration ratio is markedly and systematically associated with selected economic and social factors measured for change in the 1941 - 51 decade or for level in 1951.

Table 8.8 lists the 18 variables selected for the analysis of data for the 119 counties or census divisions with 1941 populations of 25,000 or more.[9] Using the algorithm described in Appendix D, six groups of these variables were defined, each comprising a group factor. The grouping indicated in Table 8.8 is the best grouping of the 18 variables into six groups, given the observed correlation coefficients (see Section 7.2.2). Holzinger's B-coefficients for the groups also indicated that the grouping is effective (see Section 7.2.2).

Four clusters of variables are identified in Table 8.8. The first is named "urbanization", because most of the variables in this cluster reflect the level of urbanization in a county population. The more highly urbanized counties would be expected to show higher-than-average values on the educational level of their population, on per capita income levels, on the female labour force participation rate, and on the concentration of female workers in offices or stores. They would also either contain or be relatively close to MAs. It may be noted that the variable x_{25} is actually a measure of the level of demographic urbanization (cf. Stone 1967, Appendix A), and the reason why it is not serving as the indicator variable for urbanization is given in the relevant discussion in Appendix E (Section E.1).

The next cluster of variables is called "level of living", although the variables included may seem at first to be remotely connected with this topic. Actually, it is a common finding in population studies of regions

Table 8.8 – List of Variables for Analysis of the 1951 - 61 Net Migration Ratio for Counties or Census Divisions, Canada

Group factor name[a]		Definitions of the variables
Net migration rate	Y_1[b]	= 1951 - 61 net migration ratio for males aged 20 - 34 (in 1961)[c]
	X_1*	= 1951 proportion with 13 or more years of schooling among males aged five and over who were not attending school[d]
Urbanization	X_2	= 1951 female labour force participation rate[e]
	X_3	= Proportion earning at least $3,000 in the year preceding the 1951 Census, among male wage-earners[f]
	X_{10}	= 1941 - 51 percentage change in the proportion of the male labour force in professional and technical occupations[g]
	X_{11}	= 1951 proportion in clerical occupations among females in the labour force
	X_{17}	= 1941 - 51 relative change in the proportion of male wage-earners who worked in 50 or more weeks during the year preceding the Census[h]
	X_{19}	= Distance in miles from the county's (or census division's) largest city and the nearest Census Metropolitan Area
	X_{25}	= 1951 proportion of population residing in urban centres
Level of living	X_5	= 1931 - 41 natural increase ratio[i]
	X_8	= 1951 infant mortality rates[j]
	X_{23}*	= 1951 proportion of the population which is born outside Canada
Intensity of trading activity	X_{16}*	= 1951 total sales (wholesale plus retail) per capita[k]
	X_6	= 1951 service trade receipts per capita[k]
	X_{24}	= 1951 population size
Manufacturing specialization	X_{13}*	= 1951 proportion of the male labour force in manufacturing
	X_{15}	= 1951 proportion of the male labour force in trade, finance, insurance and real estate
Professional specialization	X_9*	= 1951 proportion of the male labour force in professional and technical occupations
Demographic growth	X_{22}*	= 1941 - 51 growth rate of population

Footnotes on following page.

[a] See Table 7.1, footnote [a].

[b] See Table 7.1, footnote [b].

[c] The life table survival ratio estimate, described in Appendix C, is used. Males in the 20 - 34 age group are chosen so as to concentrate on a key segment of the population (for interpretation of economic aspects of migration) and to reduce the impact of areal variation in sex - age structure on the results of the analysis.

[d] See Table 7.1, footnote [d]. The 1951 data are in terms of the numbers of years of schooling attained.

[e] See variable X_3 in Table 7.1.

[f] See Table 7.1, footnote [c].

[g] See Table 8.1, footnote [i].

[h] See Table 8.1, footnote [i].

[i] 1931 - 41 natural increase ratio = 100 (intercensal births — intercensal deaths) 1931 population. Adjustments were made to place the vital statistics on a place of residence basis (see Stone, 1967, Appendix H), as the raw data are on a place of occurrence basis. The 1931 - 41 decade is chosen because those born in 1931 - 41 were aged 20 - 30 (see variable Y_1) in 1961.

[j] Infant mortality rate = infant deaths in the calendar year divided by births in that period.

[k] See Table 7.1, footnote [g]. The comment in that footnote also applies to the service receipts data for 1951.

* Indicates the variable chosen as the group factor indicator (see Chapter Seven, Section 7.2 and Appendix E, Section E.1). Generally, the variable having the maximum sum of correlations (absolute values) with other variables within the group was chosen as the indicator. Where the group has only two members, the variable having the highest correlation with the in-migration ratio was chosen as the indicator.

(cf. UN 1961[a], ch. III; UN 1961[b], p. 5) that populations with relatively low levels of living tend to have relatively high infant mortality and crude birth rates. (Areal differentials in the crude birth rate usually dominate such differentials in the natural increase ratio.) Although there may be a relative few glaring exceptions, it can be assumed that generally the counties with higher-than-average proportions of foreign-born persons will have higher-than-average levels of living.

The processes that the other two names (for clusters) are intended to suggest are largely self-explanatory—prominence of the county as a locale for markets judged by per capita receipts for sales and services, and manufacturing specialization. In the case of the latter factor it should be noted that variables x_{13} and x_{15} are *inversely,* although markedly, correlated.

Finally there are two ungrouped variables considered as indicators of (a) the concentration of the working force in the professional and technical segment of the occupational structure and (b) demographic growth in the decade preceding the migration period. Appendices D and E provide further details on the definition and naming of the variable clusters.

Table 8.9 shows a meaningful pattern of average correlations among the group factors. At least moderately high and positive inter-correlations

Table 8.9 – Average Product-Moment Correlation Coefficients Among Variable Clusters, from 119 Counties or Census Divisions of 25,000 and Over in 1941, Canada, 1941-51

Group factor name [a]	Urbanization	Level of living	Intensity of trading activity	Manufacturing specialization	Professional specialization	Demographic growth
Urbanization	—	0.36	0.43	0.18	0.26	0.34
Level of living	0.36	—	0.38	0.23	0.31	0.05
Intensity of trading activity	0.43	0.38	—	0.17	0.36	0.12
Manufacturing specialization	0.18	0.23	0.17	—	0.43[b]	0.44
Professional specialization	0.26	0.31	0.36	0.43[b]	—	0.16[b]
Demographic growth ..	0.34	0.05	0.12	0.44	0.16[b]	—

[a] See Chapter Seven, Section 7.2, Appendices D and E, and Table 8.8.

[b] Almost all (if not all) of the averaged correlations have negative signs. The averages are calculated from the absolute values of the coefficients.

SOURCE: Appendix Table A.10.

are shown among the urbanization, level of living, and intensity of trading factors. Positive but relatively low correlations with manufacturing specialization are shown by the urbanization and the level of living factors, while a negative correlation with manufacturing specialization is shown by the per cent in professional and technical occupations (see footnotes [14] and [15] to Chapter Seven). This latter variable shows positive correlations with each of the other factors. The 1941-51 population growth rate shows moderate and positive levels of correlation with the urbanization and manufacturing specialization factors.

8.5 FINDINGS FOR COUNTIES OR CENSUS DIVISIONS

A strong and systematic association is shown between the selected socio-economic indicators and the 1951-61 net migration ratio, for the 119 counties or census divisions. The coefficient of multiple correlation between the six factor indexes and the 1951-61 net migration ratio is 0.84. The coefficient of prediction accuracy is 65 per cent, practically the same as the percentage of net migration ratio variance explained by the indicators. It may be recalled that in these results no measurements of 1951-61 economic and social changes are included. A level of multiple correlation as high as 0.84 would be observed very rarely (three out of 1,000 times) in samples of 119 counties or census divisions in a universe where the true multiple correlation is zero (see Appendix F).[10]

The most important of the group factor indicators, in terms of contribution to the multiple correlation, is that which stands for the urbanization factor, accounting for slightly less than 50 per cent. The next most important is the 1941-51 growth rate, which also contributed 40 per cent of the multiple correlation. As mentioned above (see footnote [5]), the prominence of the growth rate in the decade preceding the migration period may partly reflect correlation between the 1941-51 and 1951-61 net migration ratios. The observed level of this correlation is 0.69 for the counties or census divisions, while that between the 1941-51 growth rate and the 1941-51 net migration ratio is 0.91. However, this serial correlation (the 0.69 value) itself may reflect certain processes of information flow (concerning opportunities) among migrants and potential migrants. It is also likely that the 1941-51 population growth rate variation reflects areal differentials in the rate of growth of the opportunities that influence migration decisions. Some support for this notion is provided by the marked and statistically significant positive correlations of the 1941-51 population growth rate with (a) the 1951 per cent of the male wage earners with at least $3,000 earnings in the year preceding the 1951 Census (0.5) and (b) the 1951 per cent of population in urban centres (0.5). In short, fast 1941-51 growth in population may have reflected relatively large increases in

the share of opportunities which influenced migration decisions over the 1951-61 decade. Among the remaining factors, only the level of living indicator contributed nearly 10 per cent of the multiple correlation (see Table 8.10).

Table 8.10 – Measures of Association Between Group Factor Indicators and Net Migration Ratio,[a] for 119 Counties or Census Divisions, Canada, 1951-61

Group factor name	Range of zero order correlation coefficients[b]	Zero order correlation coefficients with index variable[c]	Third order partial correlation coefficients with index variable[d]	Relative importance in multiple correlation[e]
				%
Urbanization	− 0.13 to 0.72	0.72	0.57	47
Level of living	− 0.39 to 0.37	0.37	0.23	9
Intensity of trading activity	0.37 to 0.48	0.37	0.11	2
Manufacturing specialization	0.22	0.22	− 0.06	1
Professional specialization	0.19	0.19	− 0.07	1
Demographic growth ...	0.65	0.65	0.58	40

[a] See Table 7.1, footnotes[a] and * in particular, and Table 8.8, footnote[c].
[b] See Table 7.3, footnote[b] and Table 8.8.
[c] See Table 7.3, footnotes[c] and [f].
[d] See Table 7.3, footnote[d]. For the first, second, fourth and sixth rows the three variables held constant are three of X_1, X_{23}, X_{13} and X_{22}. For the third and fifth rows the variables held constant are X_1, X_{22} and X_{23} (see Table 8.8).
[e] See Appendix D for explanation.

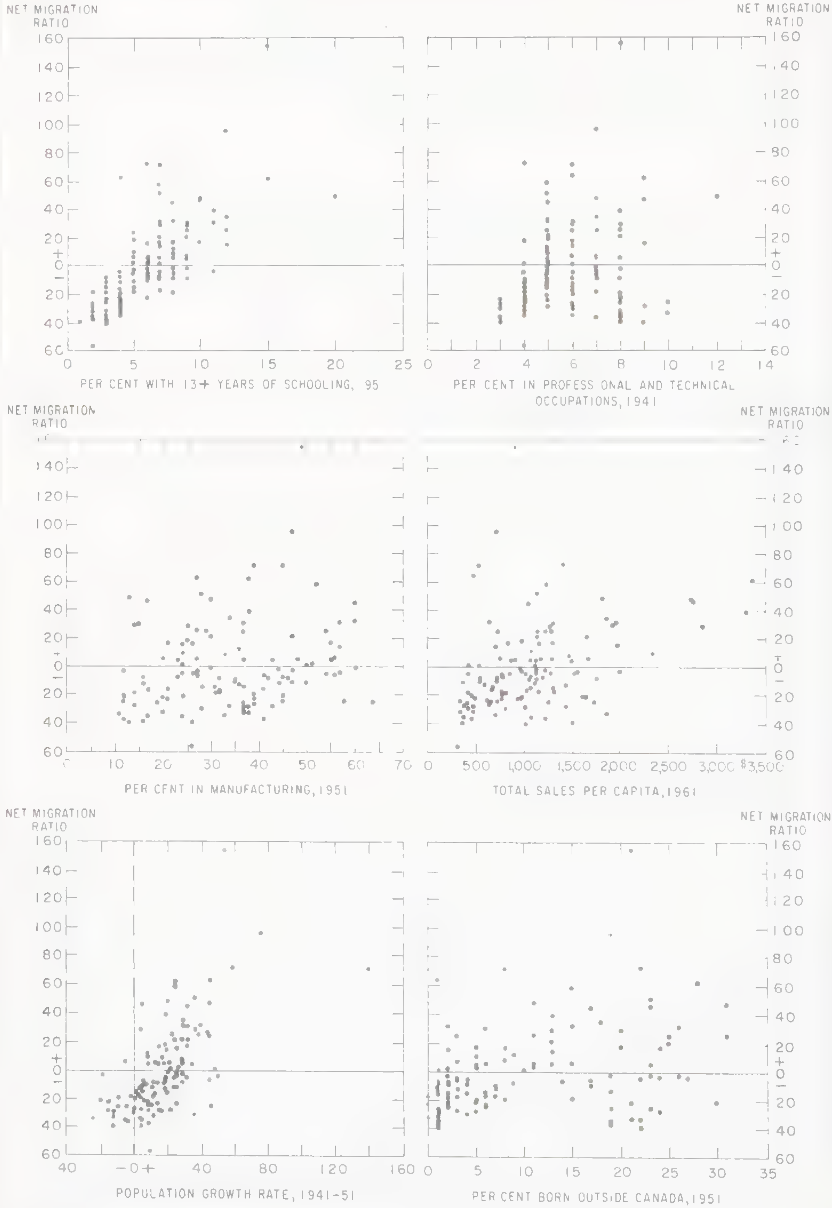
SOURCE: Appendix Table A.10.

The 1951-61 net migration ratio varies directly with four of the six selected group factor indexes (see Table 8.10 and footnote[10]). Increases over areas in the indicators of urbanization, of level of living, of the intensity of trading activity and of 1941-51 demographic growth were associated with increases in the net migration ratio. The remaining two indicators have negative third-order partial correlations with the net migration ratio (see footnote[10]). However, none of these negative correlations deviates significantly from zero (see Table 8.10 and Appendix F). More detail on the patterns of co-variation with individual indicators is shown by Chart 8.2.

Table 8.11 shows a further variation on the systematic pattern of association between the indicators and the 1951-61 net migration ratio. Areas that simultaneously had values above the median on the indicators

CHART–8.2

SCATTER DIAGRAMS SHOWING ASSOCIATION BETWEEN 'GROUP FACTOR' INDICATORS AND THE NET MIGRATION RATIO, FOR 119 COUNTIES OR CENSUS DIVISIONS OF 25,000 AND OVER IN 1941, CANADA, 1951–61



Source: Same as Appendix Table A10

Table 8.11 – Joint Distribution[a] of the Counties or Census Divisions of 25,000 and Over in 1941[b] Among Levels of Factor Indexes[c] and the Net Migration Ratio, Canada, 1951-61

Urbanization indicator	Level of living indicator above median[d]				Level of living indicator below median			
	Demographic growth indicator above median		Demographic growth indicator below median		Demographic growth indicator above median		Demographic growth indicator below median	
	Manu-facturing speciali-zation indicator above median	Manu-facturing speciali-zation indicator below median	Manu-facturing speciali-zation indicator above median	Manu-facturing speciali-zation indicator below median	Manu-facturing speciali-zation indicator above median	Manu-facturing speciali-zation indicator below median	Manu-facturing speciali-zation indicator above median	Manu-facturing speciali-zation indicator below median
	A	B	C	D	E	F	G	H
Urbanization indicator above median								
Net migration ratio above 67th percentile	0.80	0.73	0.31	0.52	0.30	0.52	0.05	0.34
Net migration ratio between 33rd and 67thpercentiles[e]	0.20	0.27	0.68	0.27	0.70	0.48	0.95	0.43
Net migration ratio below 33rd percentile	–	–	–	0.21	–	–	–	0.23
	I	J	K	L	M	N	O	P
Urbanization indicator above median								
Net migration ratio above 67th percentile	0.31	0.49	–	0.09	0.02	0.28	–	0.05
Net migration ratio between 33rd and 67th percentiles	0.69	0.51	1.00	0.15	0.44	0.72	0.17	0.21
Net migration ratio below 33rd percentile	–	–	–	0.76	0.55	–	0.83	0.74

[a] See the explanation in Table 7.4, footnote[a].
[b] The total number of counties or census divisions is 119.
[c] See Table 7.1, footnotes [a] and [b], and Appendices D and E.
[d] See Table 7.4, footnote[d].
[e] See Table 7.4, footnote[e].

SOURCE: Same as Appendix Table A.10.

were heavily concentrated among the top one third of the 1951-61 net migration ratios. Some 80 per cent of these areas had net migration ratios above the 67th percentile, while areas that simultaneously had values below the median on the factor indexes were only five per cent concentrated above the 67th percentile. Almost 75 per cent of these latter areas had values in the lowest one third of the net migration ratios. Thus, the data for the 119 counties or census divisions confirm the expectation of association between the 1951-61 net migration ratio and the selected economic and social factors.

The findings observed for the 119 counties or census divisions were re-examined for two sub-groups of these areas: 41 units containing the 1951 MAs and MUAs (henceforth called MA-counties) and 78 other counties or census divisions. Table 8.12 shows clearly that these two groups of units had very different distributions according to the 1951-61 net migration ratio. While 68 per cent of the MA-counties fell above the 67th percentile value on the net migration ratio, only 14 per cent of the other counties or census divisions had net migration ratios of this order. Only these latter counties had a significant concentration of units (47 per cent) in the lowest one third of the 1951-61 net migration ratios.

Table 8.12 – Distributions of Two Sub-groups of Counties or Census Divisions Among Levels of the Net Migration Ratio, Canada, 1951-61

Area	Net migration ratio –			A + B + C	Number
	Greater than the 67th percentile[a]	Between the 33rd and 67th percentiles[a]	Less than the 33rd percentile[a]		
	A	B	C	D	E
All units	32.8	34.4	32.8	100	119
MA – counties[b]	68.3	26.8	4.9	100	41
Others	14.1	38.5	47.4	100	78

[a] The percentile values are as follows: 33rd percentile = – 17.7; 67th percentile = 5.2. See Appendix C for definition of the net migration ratio.

[b] MA – counties are the counties or census divisions containing or adjacent to the 1961 Census Metropolitan and Major Urban Areas.

SOURCE: 1961 Census, DBS 99-511, Table 2.

The correlation matrices for the three sets of units (119, 41 and 78) differ significantly from each other (see Table 8.13) for the reason indicated

in Section 7.3.2. Considering only those correlations involving the 1951-61 net migration ratio, the mean relative deviation among pairs of correlation vectors is again significantly different from zero in each case. Thus, the data suggest significant differences between the pattern of correlation coefficients for the MA-counties (or census divisions) and that for the other units.

Table 8.13 – Measures of Deviation Between Correlation Matrices[a] for Sub-groupings of the 119 Counties or Census Divisions of 25,000 and Over in 1941, Canada, 1951-61

Correlation matrices			Correlation vectors involving the net migration ratio		
MA-counties[b] vs all 119 units	Other counties[b] vs all 119 units	MA-counties vs other counties	MA-counties vs all 119 units	Other counties vs all 119 units	MA-counties vs other counties
Mean relative deviation					
8	7	11	10	8	11
Standard error of relative deviation					
0	0	0	1	1	3

[a] See Table 7.5, footnote[a].

[b] See Table 8.12, footnote[b].

SOURCE: Appendix Table A.10.

Both the MA-counties and the others show systematic association between the 1951-61 net migration ratio and the selected social and economic factors. The multiple correlation between the six indicators and this ratio is 0.76 for both groups of areas.[11] Both groups are also similar as regards the relative importance of the indicators. The main exception to this similarity occurs among the 78 'other' counties or census divisions, where the 1941-51 growth rate is more important than the urbanization factor in contribution to multiple correlation with the net migration ratio (see Table 8.14).

Table 8.14 – Measures of Association Between Group Factor Indicators and the Net Migration Ratio[a] for Two Sub-groups of Counties or Census Divisions, Canada 1951-61

Group factor names	Range of zero order correlation coefficients[b]	Zero order correlation with index variable[c]	Third order partial correlation coefficient with index variable[d]	Relative importance in multiple correlation[e]
	MA-counties[f]			
Urbanization	0.00 to 0.58	0.58	0.51	39
Level of living	− 0.51 to 0.44	0.44	0.28	6
Intensity of trading activity	0.15 to 0.19	0.18	− 0.16	4
Manufacturing specialization	− 0.01	− 0.01	− 0.12	14
Professional specialization	0.35	0.35	− 0.04	2
Demographic growth	0.46	0.46	0.58	35
	Other units			
				%
Urbanization	− 0.27 to 0.56	0.56	0.38	30
Level of living	− 0.27 to 0.20	0.20	0.21	2
Intensity of trading activity	0.13 to 0.48	0.24	0.20	7
Manufacturing specialization	0.18	0.18	− 0.05	9
Professional specialization	− 0.12	−0.12	− 0.09	1
Demographic growth	0.59	0.59	0.56	51

[a] See Table 7.1, footnotes [a] and [f] in particular, and Table 8.8, footnote [c].
[b] See Table 7.3, footnote [b] and Table 8.8.
[c] See Table 7.3, footnotes [c] and [f].
[d] See Table 8.10, footnote [d].
[e] See Appendix D for explanation.
[f] See Table 8.12, footnote [b].

SOURCE: Appendix Table A.10.

8.6 CONCLUSION

Whether among urban complexes or among counties and census divisions, a network of economic and social indicators reflecting 1951 levels and 1941-51 changes is systematically correlated with the net

migration ratio in the following decade (1951-61). The degree of multiple correlation is relatively high, particularly among the county or census division units. In statistical contribution to this correlation, apparently economic factors are prominent. Assuming that these factors were important among the underlying set of causal forces operating in the real world, some hypotheses may be formulated about their roles as causal forces. Over the 1941-51 decade, Canada underwent rapid economic structural changes highlighted by the decline of primary activity and the relatively rapid growth of professional and skilled occupations, manufacturing, sales and services. The rapidly growing sectors were spatially concentrated for the most part in certain regions, and these regions thus had relatively large increases in the economic opportunities which attract and retain migrants. As a result, these regions may indeed have been the most effective in attracting and retaining migrants, so that they would tend to show the highest net migration ratios in the 1951-61 decade, barring strong counteracting forces peculiar to this period. Strong counteracting forces did not develop markedly in 1951-61 because this decade saw a continuation of the basic trends in structural change which were accelerated in the Second World War and its aftermath. Considering all counties or census divisions, from those with low to those with high working force concentration in non-primary activities, the major relevant economic shifts probably involved the decline of agriculture and the advances in urbanization, in manufacturing and in tertiary activity. Considering only the highly urbanized areas, the major relevant shifts probably involved the degree of increase in the performance of metropolitan functions, which spurred the demand for a more highly educated and professional work force and pushed specialization in activities like wholesale trade and business and financial services.

Given the acceptability of the analytical techniques used, it can be said that the statistics confirm basic expectations concerning the association of net migration ratios with economic and social factors among the urban complexes and counties. This apparent confirmation comes as no surprise in the light of the already existing research in this general field. What this analysis does is to provide concrete illustrations from the Canadian experience at the levels of urban complexes and of counties or census divisions, suggesting the empirical magnitudes and patterns of correlation in this experience for the chosen time period. These illustrations should provide some contribution to the knowledge about inter-regional variation in net migration ratios, and should provide some food for thought among policy-makers in the field of regional development and planning. The analysis should also demonstrate one of the ways in which census statistics can serve useful (even if limited) analytical applications in this field.

The fact that the above *general* conclusions do not distinguish sharply between the set of urban complexes and that of counties or census

divisions as units of observation, does not mean that hypotheses about areal variation in migration need not be tied to specified units. On the contrary, one of the notable points on methodology suggested by the arguments set forth above is that such hypotheses should not be considered sufficiently precise for testing until the units of observation are specified. The specification of units of observation and of time periods should be treated as components of a testable hypothesis about areal variation in migration, rather than as auxiliary items of 'housekeeping' in research design. These suggestions arise from the consideration that different complexes of causal factors may be involved in generating areal variation in migration ratios at different levels of areal aggregation. Even at a given level of areal aggregation, it may be important to know whether the chosen sample of areal units tends to have a peculiar (for example, unusually restricted) pattern of variation on one of the factors which may affect the level of migration. If the sample of areal units is selective in this sense, the causal interpretation of the observed variation in migration ratios may need serious adjustment to take into account the nature of the sample. This means that it is not quite meaningful for policy-makers to ask researchers for "explanations of regional differences in migration rates", without first indicating what kinds of region are in question.

FOOTNOTES TO CHAPTER EIGHT

[1] Measures on the socio-economic indicators for 1956 are not available. The in-migration ratio (used in Chapter Seven) is not used here because an attempt is being made to reduce the impact of 'life-cycle migration' on the areal variation of migration ratios (see Section 7.3). It should also be noted that it is not possible to separate the internal migrants from the international migrants in the net migration estimates (Chapter Seven dealt only with internal migration).

[2] Thus there is no attempt to consider factors which may have been unique to the 1951-61 decade. The term "unique" is intended to focus on 1951-61 developments which are *not* reflected in the selected measures as a result of serial correlation.

[3] Each ungrouped variable is treated as a separate group in making up this total of six.

[4] Had the subject of analysis been the level of net migration rather than the net migration *ratio*, the multiple correlation coefficient would have been 0.48 (see footnote [16] to Chapter Seven for a relevant comment).

The relevant regression equation (for the net migration *ratio* analysis) is as follows (see footnote [20] to Chapter Seven): –

$$y = a_0 + a_1x_1 + a_{13}x_{13} + a_{19}x_{19} + a_{22}x_{22} + a_{23}x_{23} + a_{25}x_{25}.$$

This is estimated as: –

$$y = -0.45 + 0.60x_1 - 0.23x_{13} + 0.00x_{19} + 0.36x_{22} + 0.39x_{23} + 0.22x_{25}.$$

The ratios of the regression coefficients to their standard errors are as follows: –

Coefficient	Ratio
a_0	–3.11
a_1	3.78
a_{13}	–2.44
a_{19}	1.90
a_{22}	3.75
a_{23}	0.71
a_{25}	1.61

[5] It is possible that the importance of this 1941 - 51 demographic growth factor may be due to serial correlation between the 1941 - 51 and 1951 - 61 net migration ratios, assuming that the 1941 - 51 net migration ratios were largely responsible for variation in the 1941 - 51 growth rate. An alternative view is indicated in Section 8.5.

[6] In the 1961 Census, the 37 MAs and MUAs defined included St. John's, Newfoundland, but, because data on changes over the 1941 - 51 decade are not available for that MA, it is excluded from this Chapter. Added to the list for this Chapter are Regina and Saskatoon.

[7] Had the level of net migration been the subject of analysis, the multiple correlation coefficient would have been 0.49.

[8] For example, the industrial distribution of the gainfully occupied is not published for counties in the 1941 Census volumes.

[9] It was necessary to exclude Alberta census divisions from the analysis, because of their re-organization (in 1956) on a basis that prohibits the estimation of 1951 - 61 net migration ratios.

[10] Had the subject of study been the level of net migration, rather than the net migration ratio, the multiple correlation coefficient would have been 0.70.

The regression equation for the net migration ratio analysis is

$$y = a_0 + a_1x_1 + a_9x_9 + a_{13}x_{13} + a_{16}x_{16} + a_{22}x_{22} + a_{23}x_{23}.$$

Estimated, this turns out to be: –

$$y = -0.38 + 1.48x_1 - 1.58x_9 - 0.13x_{13} + 0.00x_{16} + 0.74x_{22} + 0.46x_{23}.$$

The ratio of each coefficient to its standard error is as follows: –

Coefficient	Ratio
a_0	–3.87
a_1	5.48
a_9	–1.18
a_{13}	–0.84
a_{16}	1.03
a_{22}	7.25
a_{23}	1.98

[11] If the level of net migration had been the 'dependent' variable, the multiple correlation coefficient would have been 0.77 for the MA-counties (or census divisions) and 0.69 for the remaining counties or census divisions.

Once again the sensitivity of the regression coefficients (net migration ratio analysis) to the choice of areal units can be illustrated from the calculations made (see footnote [10] for the general form of the regression equation). For the 41 MA-counties the estimated equation is: —

$$y = -0.29 + 5.95x_1 - 3.05x_9 - 0.27x_{13} + 0.00x_{16} + 0.69x_{22} + 0.65x_{23}.$$

For the 78 remaining counties or census divisions the estimate is: —

$$y = -0.40 + 2.77x_1 - 1.46x_9 - 0.06x_{13} + 0.00x_{16} + 0.83x_{22} + 0.24x_{23}.$$

The ratio of each coefficient to its standard error is as follows: —

Coefficient	MA-counties	Others
a_0	−1.09	−3.45
a_1	−2.50	2.14
a_9	−0.68	−1.05
a_{13}	−0.84	−0.34
a_{16}	0.16	1.78
a_{22}	3.82	5.65
a_{23}	1.22	0.74

Concluding Remarks

A major purpose of this volume is to provide a treatment of migration in Canada which should bring out specific patterns and associations relevant to the role of migration in regional development. It is believed that the data and discussion therein have at least partially accomplished this purpose and that they illustrate some aspects of Canadian experience in regard to the links between economic factors and regional differentials in migration rates. Systematic associations of areal migration differentials with selected economic indicators are shown at the provincial, county (or census division), urban-centre, and rural farm levels. These associations lend strength to the independently founded belief that areal differentials in migration experience are symptoms and generators of areal variation in economic conditions. Particularly in regard to the peculiarities and details of the Canadian experience, this essentially exploratory study should help to enrich the fund of basic information so necessary for the proper formulation of causal models for explaining inter-regional migration.

Relevant in connection with the formulation of explanatory models for areal variation in Canadian migration are the indications (obviously not original) from this study that fully adequate models will need to include social and demographic (in addition to purely economic) factors. Also indicated is the sensitivity of the observed patterns and levels of association to the particular areal units chosen for analysis (and presumably also to the selected time periods). None of these findings is unfamiliar to specialists in migration analysis, but they need to be emphasized particularly among the policy-makers who look to such specialists for consultation. First of all, they help to provide a healthy damper to the view that general hypotheses derived from high-flying theoretical exercises are testable in their general form. It would appear more useful to view such hypotheses as untestable until the relevant areal units and time periods are specified among the premises from which they are derived, and that two hypotheses are essentially different if they differ *only* in their specifications of areal units and time periods.

In addition, the findings also point strongly to the need for examinations of the Canadian experience, regardless of the amount of research done on similar problems elsewhere. Even within Canada, the findings and conclusions from migration research at one level of areal units (e.g., provinces) cannot be automatically transferred to another level (e.g., urban centres) and there will be a continuing need to 'update' the research

findings on the same questions at a given level. The precise patterns and levels of association observed (for a fixed areal unit level and set of variables) at one time period eventually become as dated as yesterday's news. Enlightened policy-makers should, therefore, insist upon recurrent research effort aimed at updating observations based on data for periods gone by. Data-producing agencies and researchers will need to place continued emphasis on timely publication of dated research findings.

The foregoing comments should not be taken as support for the view that continued research on the distant (as well as the immediate) past is not worthwhile. Limited as they may be, the lessons of the past are an essential part of the foundation of a rational assessment of present developments and prospects for the future. Nothing in this monograph or in other research on Canadian migration would suggest that the lessons of the past have now been adequately gleaned and exposed. In short, many gaps in information about Canadian migration remain to be filled by a systematic study of the past. Hopefully, this monograph has helped to sharpen the outlines of some of the gaps, while making a small contribution to the filling of others.

In the light of the research conducted for this monograph, a few of the gaps deserving of immediate attention may be suggested. The streams of migration flowing into and out of the existing and emerging metropolitan areas are worthy of further study. These areas are the loci of the most advanced levels of technology and professional work in Canada, they are prominent among the highest income levels observed for the various types of Canadian region, and are probably the main places from which innovations emanate across Canada. Other research by the author (Stone, 1967, Chapter Six) has shown a steady 'gravitation' of the national population into the regions of metropolitan development over the past few decades, and this monograph documents the relatively large volumes of the inter-metropolitan migration streams, and the relatively high concentrations of persons with higher-level educational and occupational skills among the 1956-61 five-year migration streams flowing into and out of Census Metropolitan Areas. There is need to analyse more closely the demographic and socio-economic composition of these streams and to consider their potential impact on the composition of population in various Canadian regions. There is also an immediate need for more intensive research on the inter-provincial migration streams – research that would map in detail their demographic and socio-economic composition, examining their impact on provincial differentials in population composition and growth potential. There is obviously a great need for more information about the ways and degrees in which the spatial pattern and the levels of internal migration tend to vary over time in response to major economic changes. Finally, discussion presented in this

volume strongly suggests that the influence of social and demographic factors (such as life-cycle migration) upon the observed pattern of migration probably tends to increase with shortening of migration distances. For the proper study of short-distance migration, an integrated set of models is required which will reflect social, demographic and economic factors and which might aim at synthesizing statistics on both the inter-individual (or the inter-family) and inter-area levels of variation in migration. These are, of course, only a few of the areas in which further migration research would be useful.

Obviously, the returns on investment in such research will depend partly on the quality, detail and coverage of social, economic and demographic statistics for Canadian communities. For historical research this is a serious problem because relatively little can be done to produce very significant improvements in the adequacy (regarding quality, detail and coverage) of the already existing statistics. It is necessary to make the best of what is available in this area and this may be much less than what is desired. The improvement of statistics in the future will be largely (in the short run at least) in aid of cross-sectional studies, the limitations of which (as bases for inferences about change) are now well known.

Three major areas for such improvement emerge from the experience of preparing this monograph. First, efforts should be made to increase the rates of response (possibly through some telephone follow-up) to Population Sample questions, and to provide rough quality checks which might at least indicate the weakest parts of the body of statistics and the approximate margins of error in certain important series. Secondly, there is a need for larger samples of the longer distance (particularly inter-provincial) migration, in order to improve the reliability of cross-tabulations on the characteristics of migrants in inter-provincial and inter-metropolitan migration streams and to provide more detailed identification of the origins and destinations of such streams. Thirdly, the migration statistics for municipalities surrounding the Census Metropolitan Areas and larger cities which are not in the class of CMAs should identify separately the migrants to and from the nearby urban complex or agglomeration. This will permit the preparation of appropriate migration ratios for zones of influence around large cities which may extend well beyond the boundaries of the CMAs. Fourthly, the census designations of CMA central cities should not be confined to the largest incorporated centres. Attempts should be made to treat as one 'central city' the continuous built-up area of which the largest incorporated centre is the core – this should not be too difficult when this area is largely a complex of municipalities. Finally, serious thought should be given to finding ways of attenuating the difficulties which arise because the characteristics of migrants are obtained as of the end of the migration period.

Obviously, very significant extensions of the census schedule to include reports on occupation, education, etc., at the beginning of the migration period (actually reports as of the time of migration are preferable) are not feasible. However, it may be feasible to have limited extensions of this sort for key variables such as occupation and education. Such extensions may be practicable with a sub-sample of the Population Sample. Another avenue might be the matching of records from two consecutive censuses for a sub-sample of Population Sample respondents. Even if the sub-sample is too small to warrant full cross-tabulations of the characteristics of migrants as of the beginning of the migration period, it may be possible to use the sub-sample data to estimate probabilities of change in selected characteristics and then to apply these probabilities in approximate formulas for mobility rates based on characteristics obtained at the beginning of the migration period. Of course, the coverage of characteristics will be severely limited in accordance with the scope of the quinquennial census (that occurring at years whose numbers end with six). These are largely speculations, but it is hoped that they will help to stimulate thought on the future evolution of census schedules and tabulation practices.

Appendices A-I

Appendix A

SUPPLEMENTARY TABLES

Table A.1 – Marital Status Distributions for the Reporting Population by Five-Year Movement Status, for Selected Sex-Age Groups, Canada, by Urban, Rural Farm and Rural Non-farm, 1956-61

NOTE. — Percentages may not add to the total due to rounding error.

Marital status, sex and area	Total population	Non-movers	Movers within Canada					Migrants from abroad
			Total	Intra-municipal	Inter-municipal			
					Total	Intra-provincial	Inter-provincial	
	Population aged 15 and over							
Males								
All areas	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	28.2	32.0	23.2	22.8	23.8	23.5	24.3	29.1
Married	68.5	64.2	74.1	74.2	74.0	74.1	73.8	69.6
Widowed or divorced	3.3	3.9	2.7	3.0	2.2	2.3	1.9	1.3
Urban	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	26.0	29.0	22.8	22.2	23.7	23.3	24.6	29.1
Married	70.8	67.1	74.6	74.8	74.2	74.6	73.6	69.6
Widowed or divorced	3.2	3.9	2.7	3.0	2.1	2.1	1.8	1.2
Rural non-farm	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	29.0	33.6	22.0	23.6	20.7	20.9	19.4	20.7
Married	67.1	61.8	75.1	73.3	76.7	76.4	78.5	77.4
Widowed or divorced	3.9	4.6	2.9	3.1	2.6	2.7	2.1	2.0
Rural farm	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	39.1	39.9	34.7	32.5	37.2	36.1	42.9	52.4
Married	57.9	57.1	62.4	64.8	59.7	60.7	54.8	45.0
Widowed or divorced	3.0	3.0	2.9	2.7	3.2	3.3	2.3	2.6
Females								
All areas	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	21.4	24.0	18.5	18.4	18.6	18.8	17.9	18.2
Married	68.7	64.6	73.3	72.3	74.8	74.5	76.0	75.8
Widowed or divorced	9.9	11.4	8.2	9.3	6.6	6.7	9.0	6.1
Urban	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	21.8	24.4	19.5	18.9	20.5	20.7	19.5	18.9
Married	67.7	63.1	71.8	71.3	72.5	72.2	74.1	74.9
Widowed or divorced	10.5	12.6	8.8	9.8	7.0	7.2	6.4	6.2
Rural non-farm	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	19.0	22.4	14.1	15.0	13.4	13.9	10.8	10.1
Married	71.6	66.1	79.6	77.7	81.0	80.3	84.6	85.5
Widowed or divorced	9.4	11.5	6.4	7.3	5.6	5.8	4.6	4.4
Rural farm	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	22.8	24.6	15.1	16.1	14.1	14.3	12.4	14.1
Married	71.2	69.3	79.8	79.2	80.4	80.5	80.3	81.0
Widowed or divorced	5.9	6.1	5.1	4.7	5.5	5.2	7.3	4.9

Table A.1 – Marital Status Distributions for the Reporting Population by Five-Year Movement Status, for Selected Sex-Age Groups, Canada, by Urban, Rural Farm and Rural Non-farm, 1956-61 – concluded

Marital status, sex and area	Total population	Non-movers	Movers within Canada					Migrants from abroad
			Total	Intra-municipal	Inter-municipal			
					Total	Intra-provincial	Inter-provincial	
	Population aged 20-34							
Males								
All areas	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	35.5	58.7	22.8	21.8	23.9	23.2	25.7	34.4
Married	64.2	41.1	76.9	77.9	75.8	76.5	74.0	65.3
Widowed or divorced	0.3	0.2	0.3	0.3	0.3	0.2	0.3	0.3
Urban	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	33.2	57.6	23.1	21.9	25.0	24.3	26.6	34.6
Married	66.4	42.1	76.6	77.7	74.8	75.5	73.1	65.1
Widowed or divorced	0.3	0.3	0.3	0.4	0.3	0.2	0.3	0.3
Rural non-farm	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	32.8	54.6	18.0	18.5	17.6	17.5	18.1	22.4
Married	67.0	45.2	81.8	81.3	82.2	82.3	81.6	77.1
Widowed or divorced	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.5
Rural farm	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	57.0	65.4	32.6	29.7	35.6	34.0	42.3	62.9
Married	42.8	34.4	67.2	70.2	64.2	65.8	57.2	36.6
Widowed or divorced	0.2	0.1	0.2	0.2	0.2	0.2	0.5	0.5
Females								
All areas	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	19.9	32.0	14.0	13.5	14.6	14.4	15.3	17.2
Married	79.3	67.2	85.1	85.5	84.6	84.9	83.8	82.1
Widowed or divorced	0.8	0.8	0.9	1.0	0.8	0.8	1.2	0.7
Urban	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	21.2	35.9	15.7	14.6	17.3	17.1	17.8	18.2
Married	77.9	63.2	83.4	84.4	81.8	82.1	81.3	81.1
Widowed or divorced	0.9	0.9	1.0	1.0	0.9	0.8	0.9	0.7
Rural non-farm	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	13.8	24.1	7.6	7.7	7.6	8.0	5.2	5.3
Married	85.8	75.1	91.7	91.6	91.9	91.4	94.2	94.4
Widowed or divorced	0.4	0.8	0.7	0.8	0.6	0.6	0.6	0.3
Rural farm	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Single	20.0	27.1	7.0	7.4	6.7	6.8	6.7	9.3
Married	79.7	72.7	92.6	92.1	92.9	92.9	92.6	90.2
Widowed or divorced	0.3	0.3	0.4	0.5	0.4	0.4	0.7	0.5

SOURCE: Unpublished tabulations of the 1961 Population Sample.

Table A.2 – Five-Year Mobility and Migration Ratios for Language and Religious Groups, Canada, by Urban, Rural Non-farm and Rural Farm, 1956-61

Language and religious groups	Urban				Rural non-farm				Rural farm			
	Mobility ratio[a]	Migration ratio[a]			Mobility ratio	Migration ratio			Mobility ratio	Migration ratio		
		Total	Intra-provincial	Inter-provincial		Total	Intra-provincial	Inter-provincial		Total	Intra-provincial	Inter-provincial
All languages	49.7	18.3	14.2	4.1	39.4	21.3	17.8	3.5	16.4	7.9	6.9	1.0
Roman and Greek Catholics	50.3	16.6	13.8	2.8	36.3	17.2	14.7	2.5	13.8	6.3	5.7	0.6
Greek Orthodox	52.1	15.5	11.6	3.9	39.8	22.7	19.2	3.5	16.7	6.8	5.4	1.3
All Protestants	49.0	20.2	14.8	5.4	41.8	24.6	20.3	4.3	18.6	9.2	7.9	1.3
Jewish	48.0	8.2	6.3	1.9	44.2	31.8	17.8	14.0	21.0	19.8	17.3	2.5
Other	54.6	20.6	14.9	5.7	44.5	25.4	21.2	4.2	24.6	12.9	11.6	1.3
English only	49.3	18.9	13.8	5.1	41.2	23.9	19.6	4.3	18.8	9.2	8.0	1.2
Roman and Greek Catholics	50.6	16.7	12.0	4.6	40.4	21.2	17.1	4.2	19.2	9.6	8.4	1.2
Greek Orthodox	51.6	15.8	11.8	4.0	40.2	22.8	19.2	3.6	16.6	6.6	5.3	1.3
All Protestants	48.8	20.1	14.8	5.3	41.4	24.6	20.3	4.3	18.5	9.1	7.9	1.2
Jewish	47.4	7.8	5.9	2.0	41.5	34.0	14.9	19.2	25.4	23.8	22.2	1.6
Other	54.0	20.6	15.0	5.6	44.2	25.3	21.0	4.2	24.6	12.8	11.6	1.2
French only	48.2	15.5	14.9	0.6	31.5	12.4	11.7	0.7	10.2	4.1	4.0	0.1
Roman and Greek Catholics	48.1	15.5	14.9	0.6	31.4	12.3	11.7	0.6	10.1	4.1	3.9	0.1
Greek Orthodox	60.1	20.3	17.6	2.7	22.2	22.2	22.2	0.0	33.3	33.3	33.3	0.0
All Protestants	59.8	20.9	17.4	3.5	41.1	22.4	18.7	3.8	17.2	12.3	11.3	1.0
Jewish	71.4	7.1	5.4	1.8	00.0	00.0	00.0	0.0	00.0	00.0	00.0	0.0
Other	59.0	15.3	13.5	1.8	75.8	27.3	22.7	4.6	22.7	4.6	4.6	0.0
English and French	52.5	18.8	14.8	3.9	40.9	23.5	18.9	4.6	17.2	9.0	7.6	1.4
Roman and Greek Catholics	52.4	18.2	14.8	3.4	39.8	22.2	18.0	4.1	16.6	8.4	7.2	1.2
Greek Orthodox	54.7	14.2	11.0	3.3	50.8	40.0	32.3	7.7	32.4	25.4	16.9	8.4
All Protestants	53.3	24.6	16.6	8.0	50.5	35.6	26.3	9.3	22.2	14.0	11.3	2.8
Jewish	50.5	9.7	8.0	1.7	51.4	25.7	25.7	0.0	5.6	5.6	00.0	5.6
Other	66.0	25.1	16.2	8.8	55.3	39.0	31.8	7.2	30.4	20.6	13.0	7.6
Neither English nor French	61.0	9.5	7.4	2.0	51.5	12.0	10.9	1.1	23.3	9.8	3.7	6.1
Roman and Greek Catholics	64.9	6.9	5.6	1.3	46.1	9.2	8.6	0.6	20.4	8.3	7.9	0.4
Greek Orthodox	56.9	9.6	7.0	2.6	26.8	14.0	13.4	0.6	15.9	6.9	6.9	0.0
All Protestants	54.8	19.4	15.2	4.2	57.0	13.6	12.1	1.5	31.7	13.4	– 5.0	18.4
Jewish	56.8	3.6	3.1	0.5	00.0	00.0	00.0	0.3	00.0	00.0	0.0	00.0
Other	46.2	7.9	5.2	2.8	34.8	16.0	15.7	0.0	19.0	9.5	9.5	00.0

[a] See Table 2.10, footnote[a], and Table 3.1, footnote[b].

SOURCE: Unpublished tabulations of the 1961 Population Sample.

Table A.3 – Agricultural and Non-agricultural Income Per Capita,[a] Canada and Provinces, 1951, 1956 and 1961

(Current dollars)

Province	1951		1956		1961	
	Agricultural	Non-agricultural	Agricultural	Non-agricultural	Agricultural	Non-agricultural
Canada[b]	**666**	**1,219**	**510**	**1,507**	**619**	**1,524**
Prince Edward Island	406	812	302	1,085	285	1,049
Nova Scotia	254	896	273	1,081	204	1,081
New Brunswick	229	932	200	1,075	183	1,025
Quebec	317	1,063	266	1,313	307	1,354
Ontario	722	1,410	549	1,739	785	1,773
Manitoba	770	1,231	534	1,509	644	1,565
Saskatchewan	1,235	1,188	901	1,469	992	1,393
Alberta	996	1,366	697	1,684	904	1,588
British Columbia	685	1,405	745	1,717	793	1,681

[a] Agricultural income consists of net income of farm operators from farming operations plus wages paid in agriculture. Non-agricultural income is personal income minus agricultural income. Agricultural income is an understatement of farm income since it excludes income to farm operators and family members from non-farm sources. The agricultural and non-agricultural per capita figures are intended to indicate relative levels of return in farm and non-farm activity.

[b] Newfoundland is included in the Canada total although it does not appear in the provincial breakdown.

Table A.4 – Relative Levels[a] of Per Capita Non-agricultural Income, Canada and Provinces, 1956 and 1961

Province	1956	1961
Canada	**2.95**	**2.46**
Prince Edward Island	3.59	3.68
Nova Scotia	3.96	5.30
New Brunswick	5.38	5.60
Quebec	4.94	4.41
Ontario	3.17	2.26
Manitoba	2.83	2.43
Saskatchewan	1.63	1.40
Alberta	2.42	1.76
British Columbia	2.30	2.12

[a] The relative per capita income measures presented are ratios of per capita non-agricultural income to per capita agricultural income.

SOURCE: Calculated from income estimates presented in Table A.1.

Table A.5 – Percentage Change in Non-agricultural Wages and Salaries,[a] Canada and Provinces, 1951-61

Province	1951-61	1951-56	1956-61
Canada	**92.8**	**47.9**	**30.4**
Prince Edward Island	108.7	47.8	41.2
Nova Scotia	66.3	32.8	25.2
New Brunswick	67.9	31.6	27.6
Quebec	93.3	45.3	33.0
Ontario	90.5	47.2	29.4
Manitoba	83.7	40.5	30.7
Saskatchewan	111.0	61.5	30.6
Alberta	131.9	69.9	36.5
British Columbia	88.3	51.1	24.6

[a] Non-agricultural wages and salaries were estimated by subtracting wages paid to farm labour from total wages and salaries in all occupations. Wages and salaries estimates used were three-year averages centred on the year of reference.

SOURCES: Calculated from data in DBS, *National Accounts Income and Expenditure*, 1926-56, 1962, 1965, Table 31; DBS, *Handbook of Agricultural Statistics*, pp. 87-93; and DBS, *Farm Net Income*, 1961.

Table A.6 – Non-agricultural Service Income[a] per Worker, Canada and Provinces, 1951 and 1961

(Current dollars)

Province	1951	1961
Canada	**2,623**	**3,670**
Prince Edward Island	1,722	2,773
Nova Scotia	2,137	2,855
New Brunswick	2,315	2,827
Quebec	2,353	3,423
Ontario	2,871	3,938
Manitoba	2,595	3,651
Saskatchewan	2,304	3,440
Alberta	2,779	3,756
British Columbia	3,049	4,087

[a] Non-agricultural service income is the sum of wages and salaries in non-farm employment plus income of non-farm unincorporated business. It is intended to indicate levels of return to economic activity in each province. Service income differs from personal income by the amount of property income (interest, rent and dividends) which may accrue to residents of one province even though factors of production are employed in other provinces. See Eldridge and Thomas, 1964, p. 347.

SOURCES: Calculated from data in DBS, *National Accounts Income and Expenditure*, 1926-56, 1962 and 1965, Table 31; DBS, *Handbook of Agricultural Statistics*; DBS, *Farm Net Income*; 1951 Census Vol. I, Table 14, and 1961 Census, DBS 92-536.

Table A.7 – Percentage Change in Male Labour Force by Occupation, excluding Rural Farm Migrants 1956-61,[a] Canada and Selected Provinces, 1951-61

Occupation division	Canada	New Brunswick	Ontario	Saskatchewan	British Columbia
Managerial	23.2	12.9	25.0	5.1	33.0
Professional and technical	60.8	48.4	62.6	38.0	63.3
Clerical	26.7	13.5	23.4	10.3	23.6
Sales	36.3	31.2	41.8	− 4.7	38.7
Service and recreation	44.6	94.6	42.2	40.9	32.9
Transportation and communication	18.5	− 3.2	18.0	14.0	22.6
Farmers and farm workers	− 28.1	− 53.9	− 23.0	− 24.5	− 21.4
Other primary occupations	− 20.7	− 33.1	− 1.5	41.5	− 28.6
Craftsmen, production process and related workers	13.5	10.3	10.5	23.0	16.6
Labourers, not elsewhere classified	− 4.2	− 6.2	− 6.2	14.6	− 0.6

[a] The percentage change in employment was calculated by taking the change in number of persons in each occupation between 1951 and 1961, subtracting from that change, the number of 1956-61 rural farm migrants in each occupation group and expressing the result as a percentage of the 1951 labour force in each occupation.

SOURCE: Calculated from the 1956 Census, DBS 94-501, Table 3.

Table A.8—Correlation Matrices for the Analysis of the Inter-urban Variation in the 1956-61 Five-Year In-Migration Ratio, Canada

(Zero order product-moment correlation coefficients)

NOTE.—See Table 7.1 for the meaning of symbols; the sequence of variables follows that in Table 7.1.

Variables	All 102 urban complexes[a]							
	Y_1	X_1	X_3	X_7	X_{10}	X_{14}	X_2	X_{16}
Y_1	1.00							
X_1	0.17	1.00						
X_3	0.25	0.40	1.00					
X_7	0.32	0.58	0.35	1.00				
X_{10}	0.40	0.46	0.51	0.48	1.00			
X_{14}	0.10	0.40	0.40	0.42	0.63	1.00		
X_2	0.33	0.26	0.28	0.55	0.24	0.23	1.00	
X_{16}	0.33	0.25	0.39	0.59	0.30	0.25	0.70	1.00
X_4	0.13	0.14	0.22	0.37	−0.12	−0.05	0.30	0.44
X_5	0.17	0.21	−0.19	0.52	−0.17	−0.03	0.55	0.39
X_{11}	0.20	0.19	−0.19	0.52	−0.20	−0.04	0.47	0.32
X_6	0.12	0.66	0.42	0.40	0.34	0.20	0.04	0.07
X_9	0.12	0.22	0.41	0.22	0.20	0.12	0.15	0.26
X_{17}	−0.21	0.33	0.19	0.38	0.28	0.34	0.23	0.03
X_8	−0.36	−0.28	−0.14	−0.25	−0.53	−0.36	0.04	−0.15
X_{15}	−0.20	−0.14	−0.10	−0.09	−0.46	−0.30	0.13	0.03
X_{12}	0.47	0.15	0.36	0.13	0.30	0.18	0.22	0.39
X_{13}	0.36	0.21	0.28	0.39	0.36	0.37	0.44	0.33

Variables	X_4	X_5	X_{11}	X_6	X_9	X_{17}	X_8	X_{15}	X_{12}	X_{13}
Y_1										
X_1										
X_3										
X_7										
X_{10}										
X_{14}										
X_2										
X_{16}										
X_4	1.00									
X_5	0.40	1.00								
X_{11}	0.41	0.96	1.00							
X_6	0.12	0.14	0.11	1.00						
X_9	0.27	0.00	0.01	0.37	1.00					
X_{17}	0.09	0.10	0.11	0.21	0.20	1.00				
X_8	0.10	0.10	0.07	−0.11	−0.03	0.02	1.00			
X_{15}	0.27	0.26	0.24	−0.05	0.11	0.05	0.69	1.00		
X_{12}	0.03	0.02	−0.04	0.12	0.09	−0.21	−0.29	−0.19	1.00	
X_{13}	−0.08	0.21	0.15	0.11	0.06	0.16	−0.33	−0.16	0.64	1.00

[a] Urban complexes of 10,000 population and over in 1961.

Table A.8–Correlation Matrices for the Analysis of the Inter-urban Variation in the 1956-61 Five-Year In-Migration Ratio, Canada – continued

(Zero order product-moment correlation coefficients)

Variables	37 Quebec and Maritime urban complexes[a]							
	Y_1	X_1	X_3	X_7	X_{10}	X_{14}	X_2	X_{16}
Y_1	1.00							
X_1	0.33	1.00						
X_3	0.20	0.55	1.00					
X_7	0.40	0.54	0.19	1.00				
X_{10}	0.22	0.53	0.60	0.56	1.00			
X_{14}	0.18	0.57	0.53	0.65	0.86	1.00		
X_2	0.31	0.41	0.22	0.58	0.32	0.27	1.00	
X_{16}	0.11	0.43	0.33	0.62	0.56	0.61	0.42	1.00
X_4	0.10	0.25	0.16	0.44	0.13	0.12	0.47	0.39
X_5	0.19	0.13	-0.59	0.41	-0.18	-0.12	0.15	0.00
X_{11}	0.27	0.08	-0.60	0.43	-0.20	-0.13	0.22	-0.05
X_6	0.07	0.78	0.37	0.31	0.33	0.33	0.17	0.04
X_9	0.33	0.36	0.39	0.29	0.37	0.34	0.47	0.21
X_{17}	-0.16	0.22	0.10	0.33	0.26	0.28	0.62	0.08
X_8	-0.39	-0.37	-0.13	-0.56	-0.53	-0.52	-0.33	-0.39
X_{15}	-0.24	-0.19	-0.07	-0.36	-0.47	-0.49	-0.02	-0.23
X_{12}	0.47	0.54	0.53	0.25	0.48	0.51	0.13	0.39
X_{13}	0.55	0.29	0.30	0.40	0.37	0.50	0.42	0.11

Variables	X_4	X_5	X_{11}	X_6	X_9	X_{17}	X_8	X_{15}	X_{12}	X_{13}
Y_1										
X_1										
X_3										
X_7										
X_{10}										
X_{14}										
X_2										
X_{16}										
X_4	1.00									
X_5	0.22	1.00								
X_{11}	0.19	0.97	1.00							
X_6	0.07	0.16	0.09	1.00						
X_9	0.03	-0.18	-0.13	0.21	1.00					
X_{17}	0.17	0.11	0.12	0.17	0.27	1.00				
X_8	-0.14	-0.28	-0.34	-0.16	-0.24	0.04	1.00			
X_{15}	0.13	-0.18	-0.22	-0.01	-0.11	0.04	0.83	1.00		
X_{12}	0.04	-0.21	-0.22	0.25	0.18	-0.14	-0.41	-0.43	1.00	
X_{13}	-0.04	-0.11	-0.02	0.10	0.34	0.28	-0.36	-0.35	0.59	1.00

[a] Urban complexes of 10,000 population and over in 1961

Table A.8—Correlation Matrices for the Analysis of the Inter-urban Variation in the 1956-61 Five-Year In-Migration Ratio, Canada – continued

(Zero order product-moment correlation coefficients)

Variables	38 Ontario urban complexes[a]							
	Y_1	X_1	X_3	X_7	X_{10}	X_{14}	X_2	X_{16}
Y_1	1.00							
X_1	0.16	1.00						
X_3	0.16	0.52	1.00					
X_7	0.13	0.69	0.21	1.00				
X_{10}	0.14	0.41	0.65	0.50	1.00			
X_{14}	−0.30	0.26	0.36	0.35	0.70	1.00		
X_2	−0.13	−0.02	−0.01	0.31	0.14	0.09	1.00	
X_{16}	0.22	−0.29	0.20	−0.48	0.09	−0.06	0.06	1.00
X_4	0.58	0.26	0.21	0.17	0.02	−0.15	0.02	0.16
X_5	0.06	0.25	−0.32	0.41	−0.19	−0.08	0.44	−0.11
X_{11}	0.17	0.31	−0.28	0.46	−0.14	−0.07	0.37	−0.14
X_6	0.23	0.84	0.42	0.49	0.33	0.13	−0.11	−0.09
X_9	0.14	0.34	0.53	−0.00	0.39	0.23	−0.08	0.27
X_{17}	−0.22	0.41	0.34	0.58	0.56	0.67	0.45	−0.20
X_8	−0.07	−0.14	−0.13	−0.14	−0.25	−0.40	0.41	0.33
X_{15}	−0.01	0.05	−0.05	0.08	−0.09	−0.11	0.33	0.33
X_{12}	0.19	−0.03	0.18	−0.21	0.06	0.20	−0.29	0.37
X_{13}	−0.23	0.08	0.08	0.18	0.09	0.38	0.20	0.02

Variables	X_4	X_5	X_{11}	X_6	X_9	X_{17}	X_8	X_{15}	X_{12}	X_{13}
Y_1										
X_1										
X_3										
X_7										
X_{10}										
X_{14}										
X_2										
X_{16}										
X_4	1.00									
X_5	0.26	1.00								
X_{11}	0.37	0.94	1.00							
X_6	0.15	0.19	0.19	1.00						
X_9	0.16	−0.19	−0.19	0.52	1.00					
X_{17}	0.02	0.13	0.15	0.23	0.14	1.00				
X_8	0.05	0.38	0.34	−0.00	0.00	−0.05	1.00			
X_{15}	0.12	0.49	0.45	0.10	0.07	0.06	0.64	1.00		
X_{12}	0.09	−0.11	−0.22	0.01	0.16	−0.23	−0.29	0.08	1.00	
X_{13}	−0.17	0.18	−0.04	0.09	−0.02	0.24	−0.21	0.16	0.58	1.00

[a] Urban complexes of 10,000 population and over in 1961.

Table A.8–Correlation Matrices for the Analysis of the Inter-urban Variation in the 1956-61 Five-Year In-Migration Ratio, Canada – continued

(Zero order product-moment correlation coefficients)

Variables	27 western urban complexes[a]							
	Y_1	X_1	X_3	X_7	X_{10}	X_{14}	X_2	X_{16}
Y_1	1.00							
X_1	-0.33	1.00						
X_3	0.04	0.07	1.00					
X_7	-0.11	0.62	0.38	1.00				
X_{10}	0.45	0.28	0.42	0.48	1.00			
X_{14}	-0.17	0.30	0.49	0.44	0.46	1.00		
X_2	-0.23	0.43	-0.14	0.20	0.05	0.11	1.00	
X_{16}	0.24	-0.03	-0.08	-0.00	0.35	-0.22	-0.42	1.00
X_4	-0.57	0.03	-0.04	0.06	-0.37	-0.05	-0.27	0.14
X_5	-0.40	0.25	-0.27	0.29	-0.50	-0.14	0.21	-0.35
X_{11}	-0.34	0.20	-0.12	0.29	-0.49	-0.12	0.09	-0.36
X_6	-0.04	0.50	0.58	0.59	0.60	0.32	-0.03	0.25
X_9	-0.05	0.22	0.13	0.25	0.43	0.33	-0.28	0.42
X_{17}	-0.47	0.67	0.24	0.55	0.31	0.63	0.35	-0.19
X_8	-0.35	-0.05	-0.19	0.03	-0.46	-0.10	0.52	-0.65
X_{15}	-0.19	-0.06	-0.36	-0.18	-0.47	-0.17	0.12	-0.59
X_{12}	0.50	-0.31	0.01	-0.25	0.11	-0.12	0.01	-0.02
X_{13}	0.45	0.01	0.19	0.22	0.29	0.19	-0.04	-0.05

Variables	X_4	X_5	X_{11}	X_6	X_9	X_{17}	X_8	X_{15}	X_{12}	X_{13}
Y_1										
X_1										
X_3										
X_7										
X_{10}										
X_{14}										
X_2										
X_{16}										
X_4	1.00									
X_5	0.31	1.00								
X_{11}	0.35	0.96	1.00							
X_6	0.08	-0.09	-0.10	1.00						
X_9	0.28	-0.16	-0.14	0.35	1.00					
X_{17}	0.05	0.11	0.09	0.32	0.31	1.00				
X_8	0.14	0.49	0.43	-0.30	-0.62	0.07	1.00			
X_{15}	0.19	0.45	0.42	-0.41	-0.19	0.01	0.43	1.00		
X_{12}	-0.32	-0.08	-0.12	-0.01	-0.29	-0.43	0.01	-0.20	1.00	
X_{13}	-0.46	0.05	0.05	0.14	-0.12	-0.09	-0.21	-0.28	0.70	1.00

[a] Urban complexes of 10,000 population and over in 1961.

Table A.8–Correlation Matrices for the Analysis of the Inter-urban Variation in the 1956-61 Five-Year In-Migration Ratio, Canada – continued

(Zero order product-moment correlation coefficients)

Variables	37 MAs or MUAs[a]							
	Y_1	X_1	X_3	X_7	X_{10}	X_{14}	X_2	X_{16}
Y_1	1.00							
X_1	0.32	1.00						
X_3	0.41	0.31	1.00					
X_7	0.36	0.60	0.50	1.00				
X_{10}	0.19	0.44	0.54	0.65	1.00			
X_{14}	−0.00	0.32	0.36	0.43	0.64	1.00		
X_2	0.20	0.35	0.36	0.53	0.21	0.24	1.00	
X_{16}	0.26	0.21	0.36	0.60	0.30	0.22	0.68	1.00
X_4	0.49	0.20	0.43	0.56	0.15	0.11	0.35	0.53
X_5	0.22	0.26	−0.02	0.46	−0.10	−0.01	0.61	0.46
X_{11}	0.25	0.27	−0.02	0.49	−0.08	−0.01	0.55	0.42
X_6	0.36	0.55	0.36	0.41	0.27	0.06	0.09	0.00
X_9	0.06	0.14	0.43	0.11	0.13	0.06	0.27	0.16
X_{17}	−0.26	0.34	0.27	0.42	0.49	0.34	0.29	0.02
X_8	−0.16	−0.37	−0.14	−0.46	−0.53	−0.36	0.02	−0.27
X_{15}	−0.07	−0.23	−0.08	−0.22	−0.44	−0.29	0.18	−0.07
X_{12}	0.37	−0.08	0.25	0.16	0.05	−0.03	0.28	0.43
X_{13}	0.09	0.19	0.30	0.36	0.26	0.25	0.51	0.31

Variables	X_4	X_5	X_{11}	X_6	X_9	X_{17}	X_8	X_{15}	X_{12}	X_{13}
Y_1										
X_1										
X_3										
X_7										
X_{10}										
X_{14}										
X_2										
X_{16}										
X_4	1.00									
X_5	0.44	1.00								
X_{11}	0.49	0.96	1.00							
X_6	0.20	0.27	0.25	1.00						
X_9	0.14	0.04	0.01	0.45	1.00					
X_{17}	0.10	0.09	0.12	0.24	0.25	1.00				
X_8	−0.09	0.21	0.19	−0.04	0.18	−0.10	1.00			
X_{15}	0.04	0.35	0.33	0.05	0.23	−0.05	0.87	1.00		
X_{12}	0.28	0.27	0.13	0.11	0.08	−0.18	−0.02	0.15	1.00	
X_{13}	0.12	0.35	0.18	0.26	0.24	0.30	−0.10	0.11	0.68	1.00

[a] See Chapter Seven, footnote [1].

Table A.8–Correlation Matrices for the Analysis of the Inter-urban Variation in the 1956-61 Five-Year In-Migration Ratio, Canada – concluded

(Zero order product-moment correlation coefficients)

Variables	65 neither MAs nor MUAs[a]							
	Y_1	X_1	X_3	X_7	X_{10}	X_{14}	X_2	X_{16}
Y_1	1.00							
X_1	0.32	1.00						
X_3	0.29	0.48	1.00					
X_7	0.58	0.51	0.25	1.00				
X_{10}	0.51	0.52	0.50	0.41	1.00			
X_{14}	0.35	0.53	0.52	0.41	0.77	1.00		
X_2	0.51	0.12	0.22	0.55	0.25	0.19	1.00	
X_{16}	0.40	0.30	0.40	0.62	0.30	0.34	0.71	1.00
X_4	0.11	0.07	0.12	0.25	-0.24	-0.28	0.26	0.40
X_5	0.25	0.13	-0.31	0.55	-0.22	-0.11	0.50	0.36
X_{11}	0.28	0.10	-0.29	0.53	-0.26	-0.15	0.42	0.27
X_6	0.16	0.77	0.45	0.35	0.39	0.39	-0.03	0.10
X_9	0.24	0.25	0.39	0.24	0.23	0.18	0.05	0.31
X_{17}	-0.04	0.25	0.34	0.32	0.37	0.35	0.05	0.10
X_8	-0.37	-0.33	-0.16	-0.26	-0.55	-0.54	0.02	-0.11
X_{15}	-0.18	-0.18	-0.14	-0.13	-0.49	-0.47	0.05	0.07
X_{12}	0.41	0.48	0.49	0.34	0.43	0.56	0.31	0.43
X_{13}	0.48	0.26	0.27	0.46	0.41	0.61	0.41	0.35

Variables	X_4	X_5	X_{11}	X_6	X_9	X_{17}	X_8	X_{15}	X_{12}	X_{13}
Y_1										
X_1										
X_3										
X_7										
X_{10}										
X_{14}										
X_2										
X_{16}										
X_4	1.00									
X_5	0.38	1.00								
X_{11}	0.37	0.97	1.00							
X_6	0.05	0.02	-0.01	1.00						
X_9	0.31	-0.05	-0.02	0.29	1.00					
X_{17}	0.06	-0.09	-0.10	0.25	0.08	1.00				
X_8	0.16	0.01	-0.01	-0.20	-0.18	-0.10	1.00			
X_{15}	0.35	0.18	0.17	-0.17	-0.00	-0.07	0.58	1.00		
X_{12}	0.02	0.01	-0.03	0.23	0.18	-0.10	-0.31	-0.24	1.00	
X_{13}	-0.17	0.15	0.13	0.02	-0.05	0.02	-0.45	-0.31	0.70	1.00

[a] See Chapter Seven, footnote [1].

SOURCES: Unpublished tabulations of the 1961 Population Sample, DBS 63-509, Table 3; 1961 Census, DBS 98-501, Table A.3; DBS 94-519, Tables 2, 3 and 4; DBS 94-520, Table 5; DBS 94-521, Table 6; DBS 94-522, Table 7; DBS 92-557, Tables 104 and 105; DBS 92-547, Tables 52-54; DBS 92-552, Tables 79-80; DBS 92-550, Tables 75-77; DBS 92-504 Tables 7-9; DBS 94-509, Table 10; DBS 94-506, Table 11; DBS 94-534, Tables 11-13; DBS 92-535, Tables 9-10.

Table A.9 – Correlation Matrices for the Analysis of Inter-urban Variation in the 1951-61 Net Migration Ratio, Canada

(Zero order product-moment correlation coefficients)

NOTE. – See Table 8.1 for the meaning of the symbols.

Variables	All 63 urban complexes[a]							
	Y	X_1	X_3	X_5	X_6	X_8	X_{11}	X_{13}
Y	1.00							
X_1	0.53	1.00						
X_3	0.38	0.54	1.00					
X_5	0.38	0.40	0.16	1.00				
X_6	0.49	0.69	0.40	0.55	1.00			
X_8	-0.42	-0.73	-0.45	-0.32	-0.48	1.00		
X_{11}	0.57	0.56	0.60	0.57	0.61	-0.54	1.00	
X_{13}	-0.17	-0.12	-0.00	-0.41	-0.36	0.21	-0.42	1.00
X_9	0.21	-0.01	0.18	0.19	0.33	-0.03	0.35	-0.18
X_{17}	0.25	-0.01	-0.06	0.16	0.24	-0.08	0.41	-0.51
X_{23}	0.30	0.27	0.51	0.21	0.48	-0.24	0.55	-0.14
X_{24}	0.20	0.03	-0.18	0.29	0.28	-0.21	0.12	0.06
X_{10}	-0.07	-0.14	-0.11	-0.21	-0.11	0.10	-0.16	0.04
X_{19}	-0.24	-0.02	-0.04	-0.15	-0.26	0.02	-0.13	-0.19
X_{21}	0.24	0.23	0.14	0.51	0.30	-0.09	0.32	-0.04
X_{22}	0.40	0.17	0.14	0.01	0.15	-0.01	0.08	0.19
X_{25}	0.16	0.12	0.26	0.01	0.03	-0.12	0.21	0.20

Variables	X_9	X_{17}	X_{23}	X_{24}	X_{10}	X_{19}	X_{21}	X_{22}	X_{25}
Y									
X_1									
X_3									
X_5									
X_6									
X_8									
X_{11}									
X_{13}									
X_9	1.00								
X_{17}	0.39	1.00							
X_{23}	0.75	0.37	1.00						
X_{24}	0.41	0.27	0.38	1.00					
X_{10}	-0.01	-0.19	-0.01	0.03	1.00				
X_{19}	-0.21	-0.14	-0.24	-0.50	0.14	1.00			
X_{21}	0.20	0.03	0.21	0.23	0.31	-0.26	1.00		
X_{22}	0.14	0.08	-0.02	0.06	-0.09	-0.14	0.01	1.00	
X_{25}	0.09	-0.06	0.27	0.06	0.00	-0.10	0.07	-0.11	1.00

[a] Urban complexes of 10,000 population and over in 1941.

Table A.9 – Correlation Matrices for the Analysis of Inter-urban Variation in the 1951-61 Net Migration Ratio, Canada – continued

(Zero order product-moment correlation coefficients)

Variables	38 MAs and MUAs[a]							
	Y	X_1	X_3	X_5	X_6	X_8	X_{11}	X_{13}
Y	1.00							
X_1	0.57	1.00						
X_3	0.45	0.47	1.00					
X_5	0.36	0.40	0.02	1.00				
X_6	0.64	0.74	0.26	0.52	1.00			
X_8	-0.57	-0.77	-0.44	-0.39	-0.57	1.00		
X_{11}	0.63	0.54	0.52	0.53	0.56	-0.67	1.00	
X_{13}	-0.21	-0.12	0.09	-0.46	-0.37	0.21	-0.53	1.00
X_9	0.37	0.07	0.18	0.18	0.31	-0.03	0.41	-0.29
X_{17}	0.22	-0.08	-0.15	0.10	0.15	-0.09	0.40	-0.55
X_{23}	0.45	0.34	0.38	0.11	0.45	-0.24	0.54	-0.22
X_{24}	0.35	0.20	-0.20	0.39	0.48	-0.26	0.36	-0.11
X_{10}	0.21	0.31	0.32	-0.12	0.07	-0.34	0.24	-0.02
X_{19}	-0.31	-0.12	-0.02	-0.21	-0.41	0.12	-0.20	-0.09
X_{21}	0.15	0.21	0.05	0.48	0.31	-0.13	0.26	-0.10
X_{22}	0.34	0.03	0.22	-0.07	0.10	-0.02	-0.01	0.21
X_{25}	0.19	0.08	0.19	-0.04	-0.04	-0.10	0.20	0.19

Variables	X_9	X_{17}	X_{23}	X_{24}	X_{10}	X_{19}	X_{21}	X_{22}	X_{25}
Y									
X_1									
X_3									
X_5									
X_6									
X_8									
X_{11}									
X_{13}									
X_9	1.00								
X_{17}	0.40	1.00							
X_{23}	0.83	0.43	1.00						
X_{24}	0.39	0.37	0.46	1.00					
X_{10}	0.18	-0.20	0.21	-0.01	1.00				
X_{19}	-0.25	-0.25	-0.26	-0.62	0.33	1.00			
X_{21}	0.19	-0.01	0.19	0.29	-0.25	-0.26	1.00		
X_{22}	0.19	0.06	0.10	0.12	0.03	-0.27	-0.13	1.00	
X_{25}	-0.02	-0.09	0.17	0.13	0.16	-0.62	0.29	-0.10	1.00

[a] See Chapter Eight, footnotes [7] and [8].

Table A.9 – Correlation Matrices for the Analysis of Inter-urban Variation in the 1951-61 Net Migration Ratio, Canada – concluded

(Zero order product-moment correlation coefficients)

Variables	25 neither MAs nor MUAs[a]							
	Y	X_1	X_3	X_5	X_6	X_8	X_{11}	X_{13}
Y	1.00							
X_1	0.31	1.00						
X_3	−0.03	0.59	1.00					
X_5	0.06	0.29	0.38	1.00				
X_6	−0.07	0.55	0.61	0.69	1.00			
X_8	−0.19	−0.71	−0.52	−0.25	−0.32	1.00		
X_{11}	0.02	0.52	0.65	0.61	0.75	−0.41	1.00	
X_{13}	−0.28	−0.19	−0.23	−0.58	−0.43	0.22	−0.44	1.00
X_9	−0.44	−0.28	0.08	0.09	0.34	−0.02	0.09	−0.05
X_{17}	0.18	0.08	−0.02	0.38	0.50	−0.07	0.37	−0.56
X_{23}	0.36	0.05	0.63	0.41	0.51	−0.27	0.47	−0.05
X_{24}	0.21	−0.32	−0.22	−0.02	−0.15	−0.13	−0.43	0.34
X_{10}	0.08	−0.48	−0.21	−0.06	−0.21	0.63	−0.25	0.27
X_{19}	0.24	0.36	0.01	0.44	0.33	−0.24	0.28	−0.51
X_{21}	0.08	0.39	0.15	0.29	0.31	−0.32	0.14	−0.04
X_{22}	0.33	0.27	−0.19	−0.12	0.13	0.02	−0.10	0.10
X_{25}	0.02	0.12	0.29	0.00	0.08	−0.14	0.16	0.19

Variables	X_9	X_{17}	X_{23}	X_{24}	X_{10}	X_{19}	X_{21}	X_{22}	X_{25}
Y									
X_1									
X_3									
X_5									
X_6									
X_8									
X_{11}									
X_{13}									
X_9	1.00								
X_{17}	0.37	1.00							
X_{23}	0.56	0.15	1.00						
X_{24}	0.43	−0.02	0.24	1.00					
X_{10}	−0.03	−0.08	0.00	0.15	1.00				
X_{19}	−0.02	0.51	−0.14	−0.17	−0.32	1.00			
X_{21}	−0.17	−0.18	−0.10	0.05	−0.20	−0.03	1.00		
X_{22}	−0.06	0.01	−0.43	−0.07	0.14	0.32	0.28	1.00	
X_{25}	0.18	−0.07	0.35	−0.03	0.03	−0.32	−0.10	−0.23	1.00

[a] Urban complexes of 10,000 and over in 1941.

[b] See Chapter Eight, footnotes [7] and [8].

SOURCES: 1941 Census, Vol. II, Table 45; Vol. VI, Table 4; Vol. VII, Tables 7, 9 and 22-25; Vol. X, Table 8; Vol. XI, Tables 3 and 5. 1951 Census, Vol. I, Tables 48, 57 and 61; Vol. IV, Tables 6 and 17; Vol. V, Tables 3 and 16; Vol. VII, Table 4; Vol. VIII, Tables 5 and 24. DBS, *Vital Statistics* (annual), 1950 (Table 26), 1951 (Table 26), 1952 to 1960 (Table 7), 1961 (Table 27). 1961 Census, DBS 92-535, Tables 9, 10, and 11; DBS 99-512, Table X; DBS 92-539, Table 6.

Table A.10 – Correlation Matrices for the Analysis of Inter-county Variation in the 1951-61 Net Migration Ratio, Canada

(Zero order product-moment correlation coefficients)

NOTE. —See Table 8.8 for the meaning of symbols.

Variables	All 119 counties or census divisions[a]								
	Y_1	X_1	X_2	X_3	X_{10}	X_{11}	X_{17}	X_{19}	X_{25}
Y_1	1.00								
X_1	0.72	1.00							
X_2	0.48	0.71	1.00						
X_3	0.69	0.78	0.45	1.00					
X_{10}	0.48	0.62	0.52	0.68	1.00				
X_{11}	0.66	0.85	0.63	0.79	0.62	1.00			
X_{17}	0.54	0.69	0.67	0.65	0.67	0.69	1.00		
X_{19}	-0.13	-0.32	-0.46	-0.12	-0.15	-0.27	-0.33	1.00	
X_{25}	0.51	0.70	0.80	0.64	0.59	0.69	0.73	-0.39	1.00
X_5	-0.39	-0.50	-0.39	-0.33	-0.34	-0.52	-0.42	0.40	-0.28
X_8	-0.29	-0.46	-0.26	-0.41	-0.40	-0.54	-0.45	0.20	-0.24
X_{23}	0.37	0.45	0.11	0.54	0.36	0.51	0.33	0.08	0.09
X_{16}	0.37	0.58	0.50	0.49	0.44	0.66	0.48	-0.13	0.45
X_6	0.48	0.59	0.45	0.57	0.39	0.61	0.48	-0.08	0.48
X_{24}	0.32	0.45	0.45	0.36	0.27	0.42	0.31	-0.20	0.45
X_{13}	0.23	0.15	0.34	0.23	0.28	0.04	0.27	-0.24	0.37
X_{15}	-0.15	0.02	0.05	-0.23	-0.08	0.10	-0.11	-0.13	-0.23
X_9	0.19	0.47	0.23	0.31	0.32	0.35	0.27	-0.01	0.13
X_{22}	0.65	0.39	0.37	0.42	0.22	0.36	0.33	-0.12	0.47

Variables	X_5	X_8	X_{23}	X_{16}	X_6	X_{24}	X_{13}	X_{15}	X_9	X_{22}
Y_1										
X_1										
X_2										
X_3										
X_{10}										
X_{11}										
X_{17}										
X_{19}										
X_{25}										
X_5	1.00									
X_8	0.60	1.00								
X_{23}	-0.44	-0.64	1.00							
X_{16}	-0.42	-0.55	0.62	1.00						
X_6	-0.30	-0.40	0.55	0.66	1.00					
X_{24}	-0.16	-0.17	0.26	0.63	0.43	1.00				
X_{13}	-0.16	0.06	-0.16	-0.26	-0.06	0.05	1.00			
X_{15}	-0.26	-0.37	0.36	0.48	0.03	0.13	-0.51	1.00		
X_9	-0.08	-0.38	0.46	0.52	0.33	0.24	-0.42	0.44	1.00	
X_{22}	-0.07	0.08	-0.01	-0.09	0.12	0.14	0.45	-0.42	-0.16	1.00

[a] Counties or census divisions that had at least 25,000 population in 1941. See Chapter Eight, footnote [11].

Table A.10 – Correlation Matrices for the Analysis of Inter-county Variation in the 1951-61 Net Migration Ratio, Canada – continued

(Zero order product-moment correlation coefficients)

Variables	41 MA-counties or census divisions[a]								
	Y_1	X_1	X_2	X_3	X_{10}	X_{11}	X_{17}	X_{19}	X_{25}
Y_1	1.00								
X_1	0.58	1.00							
X_2	0.18	0.59	1.00						
X_3	0.50	0.58	0.02	1.00					
X_{10}	0.23	0.42	0.22	0.57	1.00				
X_{11}	0.43	0.67	0.46	0.58	0.38	1.00			
X_{17}	0.26	0.38	0.53	0.28	0.36	0.36	1.00		
X_{19}	-0.23	-0.30	-0.44	-0.08	0.03	-0.18	-0.16	1.00	
X_{25}	0.00	0.27	0.62	0.05	0.04	0.24	0.35	-0.26	1.00
X_5	-0.47	-0.54	-0.45	-0.35	-0.42	-0.55	-0.41	0.25	-0.14
X_8	-0.51	-0.42	-0.23	-0.58	-0.59	-0.59	-0.42	0.11	0.01
X_{23}	0.44	0.49	0.15	0.69	0.54	0.56	0.26	0.03	-0.04
X_{16}	0.18	0.45	0.61	0.29	0.30	0.62	0.26	-0.10	0.50
X_6	0.16	0.37	0.47	0.23	0.21	0.38	0.24	-0.08	0.28
X_{24}	0.19	0.38	0.46	0.26	0.17	0.35	0.19	-0.21	0.50
X_{13}	-0.01	-0.14	-0.04	0.09	0.28	-0.40	0.27	-0.16	-0.11
X_{15}	0.28	0.41	0.60	-0.04	0.04	0.59	0.09	-0.26	0.29
X_9	0.35	0.79	0.41	0.35	0.18	0.54	0.03	-0.20	0.12
X_{22}	0.46	0.01	-0.10	0.08	-0.20	-0.02	-0.02	-0.28	-0.01

Variables	X_5	X_8	X_{23}	X_{16}	X_6	X_{24}	X_{13}	X_{15}	X_9	X_{22}
Y_1										
X_1										
X_2										
X_3										
X_{10}										
X_{11}										
X_{17}										
X_{19}										
X_{25}										
X_5	1.00									
X_8	0.70	1.00								
X_{23}	-0.60	-0.75	1.00							
X_{16}	-0.38	-0.45	0.47	1.00						
X_6	-0.28	-0.41	0.44	0.69	1.00					
X_{24}	-0.20	-0.19	0.31	0.70	0.48	1.00				
X_{13}	-0.05	-0.03	0.08	-0.38	-0.26	-0.09	1.00			
X_{15}	-0.45	-0.31	0.26	0.73	0.38	0.34	-0.49	1.00		
X_9	-0.26	-0.12	0.20	0.45	0.36	0.32	-0.43	0.49	1.00	
X_{22}	-0.10	0.07	0.01	-0.36	-0.33	-0.08	0.25	-0.11	-0.12	1.00

[a] Counties or census divisions that contained or were adjacent to 1961 MAs or MUAs.

Table A.10 – Correlation Matrices for the Analysis of Inter-county Variation in the 1951-61 Net Migration Ratio, Canada – concluded

(Zero order product-moment correlation coefficients)

Variables	78 other counties or census divisions								
	Y_1	X_1	X_2	X_3	X_{10}	X_{11}	X_{17}	X_{19}	X_{25}
Y_1	1.00								
X_1	0.56	1.00							
X_2	0.22	0.44	1.00						
X_3	0.54	0.71	0.15	1.00					
X_{10}	0.26	0.46	0.29	0.49	1.00				
X_{11}	0.52	0.85	0.31	0.70	0.45	1.00			
X_{17}	0.31	0.59	0.40	0.49	0.53	0.55	1.00		
X_{19}	0.27	−0.05	−0.32	0.23	0.03	−0.02	−0.16	1.00	
X_{25}	0.27	0.59	0.65	0.51	0.44	0.53	0.52	−0.23	1.00
X_5	−0.27	−0.50	−0.28	−0.22	−0.21	−0.51	−0.37	0.40	−0.21
X_8	−0.02	−0.49	−0.13	−0.25	−0.25	−0.52	−0.41	0.16	−0.17
X_{23}	0.20	0.38	−0.16	0.42	0.18	0.45	0.25	0.23	−0.14
X_{16}	0.24	0.52	0.08	0.44	0.34	0.58	0.44	0.06	0.11
X_6	0.48	0.57	0.10	0.59	0.22	0.59	0.34	0.14	0.28
X_{24}	0.13	0.26	0.08	0.18	0.07	0.32	0.15	0.22	0.22
X_{13}	0.18	0.07	0.43	0.04	0.08	−0.01	0.03	−0.18	0.43
X_{15}	−0.36	−0.08	−0.09	−0.29	−0.03	0.03	−0.07	−0.15	−0.41
X_9	−0.12	0.16	−0.05	0.16	0.28	0.13	0.23	0.18	−0.11
X_{22}	0.59	0.29	0.31	0.28	0.04	0.20	0.07	0.25	0.36

Variables	X_5	X_8	X_{23}	X_{16}	X_6	X_{24}	X_{13}	X_{15}	X_9	X_{22}
Y_1										
X_1										
X_2										
X_3										
X_{10}										
X_{11}										
X_{17}										
X_{19}										
X_{25}										
X_5	1.00									
X_8	0.54	1.00								
X_{23}	−0.33	−0.57	1.00							
X_{16}	−0.43	−0.64	0.77	1.00						
X_6	−0.23	−0.32	0.58	0.53	1.00					
X_{24}	0.21	−0.08	0.11	0.17	0.14	1.00				
X_{13}	−0.13	0.22	−0.45	−0.46	−0.16	−0.06	1.00			
X_{15}	−0.24	−0.46	0.47	0.50	−0.07	−0.03	−0.52	1.00		
X_9	0.06	−0.45	0.56	0.56	0.22	−0.03	−0.56	0.48	1.00	
X_{22}	0.11	0.32	−0.24	−0.30	0.12	0.34	0.50	−0.63	−0.45	1.00

SOURCES: 1941 Census, Vol. VI, Table 3; Vol. VII, Table 11. 1951 Census, Vol. I, Tables 22, 47 and 60; Vol. IV, Tables 10 and 18; Vol. V, Table 15. 1961 Census, DBS 92-547, Table 51; DBS 92-542, Table 22; DBS 94-508, Table 15; DBS 94-535, Table 14. DBS 63-503, Table 3. DBS 63-509, Table 3. DBS, *Vital Statistics* (annual), 1951, Table 25. Stone, 1967[a], Table L.4.

Appendix B

THE 1961 POPULATION SAMPLE

B.1 BASIC PROCEDURES AND CENSUS CONCEPTS

The 1961 Population Sample was a 20 per cent household sample taken in conjunction with the 1961 Census of Canada. It was designed to represent persons five years old and over on June 1, 1961, who were at that time *residing in private households*. The sampling universe *excluded* residents of collective-type dwellings such as institutions, hotels and large lodging houses, persons enumerated as temporary residents who were not reported at their usual place of residence elsewhere in Canada, overseas military and government personnel and their families, and persons located after the regular census through postal check or re-enumeration.[1] Thus, the sample was *not designed* to represent the total population of Canada.[2]

There may have been a further modification of the sampling universe which did not arise by design. This was due to those persons who fell into the sample but for whom an adequate report on residence in 1956 was not available. These persons modify the sampling universe (or, put otherwise, introduce a selection bias in the sample returns) to the extent that their migratory behaviour (as group) differs markedly from those for whom adequate reports of 1956 residence were received. These persons may also introduce a selection bias in tables showing distributions of the sample by migration status *and* by selected individual characteristics to the extent that their distributions differ from the ones tabulated. Of course, the magnitude of the bias depends on the size of persons with inadequate records relative to the size of those with adequate records. In this monograph the figures for persons with inadequate records (generally indicated in 'not stated' columns of the basic tabulations) have been excluded before the calculation of migration ratios or of percentage distributions. For this reason the data are said to refer to the *reporting population*.

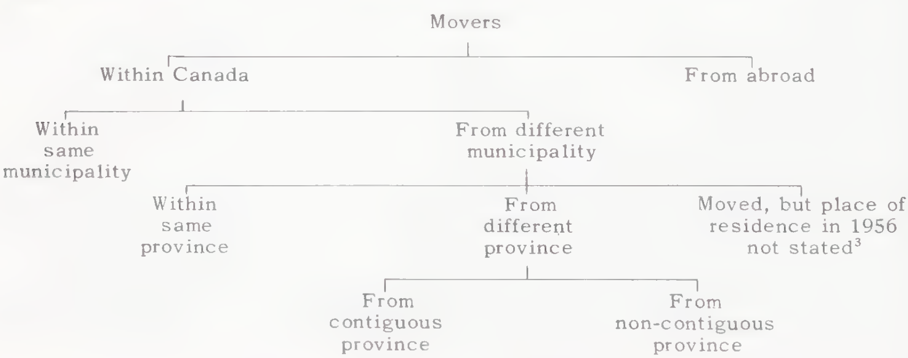
The sampling units were private households and the sample was drawn by systematic selection of every fifth household. Of course, since the household (a cluster of individuals) was the sampling unit, the total number of individuals falling into the sample may not be exactly one fifth of the private household population. The enumerated private household population was 96 per cent of the enumerated total population of Canada (Wargon, 1967).

Mobility status was measured on the basis of response given to the following questions asked of all persons 15 years old and over in each sample household: –

	Same dwelling	Same city, town, etc., (not same home)	Outside of Canada	Different city, town, village, etc., in Canada
1. Did you live in this dwelling 5 years ago, on June 1, 1956?	☐ 0	☐ 1	☐ 2	☐ 3
	Omit Questions 2 and 3			
2. In what city, town, village or municipality did you live?	.... (Name of city, town, village, municipality, etc.)			.... (Province or territory)
	Important: If outside a city or town limit, specify name of suburban municipality, and not that of city or town.			
3. Was this dwelling on a farm or small agricultural holding? (One acre and $50 sales)	No ☐ 0	Yes ☐ 1		

Persons who were born since June 1, 1956, and were thus under five years of age at the time of the 1961 Census, were excluded. For family persons five to 14 years of age, the migration status of the head of the family was assigned; for non-family members, the mobility status of the head of the household was used.

Mobility status and type of movement were determined on the basis of the reported usual places of residence on June 1 in 1956 and in 1961. If a person lived in the same dwelling on both dates, that person was defined as a non-mover. The category of non-movers, therefore, includes those who had moved during the five-year period but had returned by 1961 to their 1956 residence as well as those who had never moved during the period. If the dwelling where a person lived on June 1, 1961 differed from that five years earlier, that person was defined as a mover. Multiple movements of the period therefore are not accountable. Movers were further divided as follows: –



The term "migrant" refers to those who moved across municipal boundaries (from a different municipality or from abroad). The internal migrants exclude the migrants from abroad.

Estimates were derived by a ratio estimation procedure for each of the following 76 groups in each of the geographic areas for which tabulations were prepared in regard to the population aged five and over: –

Males, single five years old and over, for 14 age groups
Males, married, 15 years old and over, for 12 age groups
Males, widowed or divorced, 15 years old and over for 12 age groups
Females, single, five years old and over for 14 age groups
Females, married, 15 years old and over for 12 age groups
Females, widowed or divorced, 15 years old and over for 12 age groups.

For each of the 76 groups in a given geographic area, the ratio of the complete count to the sample count of the population in the groups was used as the weight for estimating persons in that group with characteristics about which information was obtained from the sample. Mechanical limitations did not permit the use of integer weights which would eliminate complications involved in rounding. Fractional weights used have inevitably introduced some rounding error, resulting in slight variations in corresponding totals and sub-totals from one table to another. No attempt has been made to reconcile these minor discrepancies.

In the case of the labour force, estimation was conducted for each of the following groups: –

Males, single 15 years old and over, for eight age groups
Males, married, 15 years old and over, for eight age groups
Males, widowed or divorced, 15 years old and over, for eight age groups
Females, single, 15 years old and over, for eight age groups
Females, married, 15 years old and over, for eight age groups
Females, widowed or divorced, 15 years old and over, for eight age groups.

B.2 CONCEPT OF FIVE-YEAR MIGRATION

The term "five-year migration" has been used to remind the reader that the migration reflected by the Population Sample does *not* include all the various kinds of moves that took place during the migration period. What the sample reflects directly are differences between the places of residence, of a particular individual, at June 1, 1956 and at June 1, 1961. Thus the data do not show multiple moves and retain migration that took place between these two dates. The statistics do not provide an adequate measure of the total number of migrations (to which total a given individual may make more than one contribution) taking place from June 1, 1956 to June 1, 1961. Thus the data are said to refer to "five-year migration".

There are other reasons why the census migration question does not provide a fully adequate measure of the total number of migrations. First, persons who were alive on June 1, 1956, migrated and then died before June 1, 1961 are obviously not counted. Secondly, persons who were alive on June 1, 1956 but left Canada before the 1961 Census are also not counted. Thirdly, there are those who were missed by the census. It is important to bear in mind the foregoing comments when attempting to interpret the census migration statistics.

B.3 TOWARD AN EVALUATION OF THE POPULATION SAMPLE

Except for the work of Wargon, 1967, in identifying totals for certain population sub-groups (e.g., persons in collective-type households excluded from the sample) and in reviewing data-processing steps, no evaluation of the migration data from the 1961 Population Sample has been available to the writer. It is not possible, within the time available for this study, to do the methodological research and statistical detective work required to produce an adequate evaluation of the sample in this Appendix. Such an evaluation should include critical reviews of sample design, sample selection, estimation formulas and procedures and the many data-processing operations which may have brought errors into the statistics. It would also be appropriate to attempt to indicate formulas and measures for sampling variance in some of the key statistics and assess the likely levels of the biases in such key statistics. Much of the background information needed to make such an evaluation has not been recorded in a convenient manner, and even if it were so recorded the evaluation outlined would be a major undertaking requiring very substantial allocation of professional, clerical, programming and computer time. Lacking this kind of evaluation, the author has simply exercised certain general precautions in using the statistics so as to improve the chances that the levels and differentials shown in this monograph are approximately genuine.

B.3.1 SOURCES OF ERROR – Conventionally, errors in sample statistics are placed into two general classes – unreliability and bias. Unreliability (lack of precision) arises because of unsystematic variations that tend to offset each other. Such variations may come from differences between the samples that could be drawn or from observational errors (errors in reporting, recording or data processing). Bias refers to the net error that remains after the unsystematic variations cancel each other to some extent (precisely, bias is the difference between the mathematical expectation of the estimate and the true value which the estimate is intended to measure). Bias may arise from sampling procedures, estimation procedures, reporting, recording or data processing. Most bias sources (the notable exceptions being sample selection bias and sample estimation bias) affect complete counts as well

as samples. (The reader wishing more detail may consult Hansen, Hurwitz and Madow, 1954; Kish, 1965; Hansen, Hurwitz and Bershad, 1960; Fellegi, 1964; U.S. Bureau of the Census, 1964; and Shryock, 1964).

As already mentioned, the information needed to comment usefully on the likely levels of error in Population Sample statistics is not available. Of course, there are various isolated anomalies that one encounters in using any large body of census statistics but a listing of these anomalies would hardly pass for serious and systematic evaluation of the quality of the sample statistics. Indeed, the quality of a large body of statistics does not stand or fall on the existence of a small catalogue of isolated anomalies. Moreover, it is difficult to draw sound conclusions about data quality without first specifying the purposes for which the data are to be used. For example, data that are unacceptable for the allocation of tax revenues to regions on a per-head basis can be entirely adequate for a wide range of scientific research.

Lacking systematic and concrete evaluation of errors in the sample statistics, certain steps have been taken to avoid the kinds of figures that are most likely to be suspect, the identification of which is based on previous research on the quality of census statistics (notably the work of Hansen, Hurwitz and Bershad, 1960; U.S. Bureau of the Census, 1964; Shryock, 1964; and Fellegi, 1964). For example, the writer has, for the most part, avoided emphasizing ratios or percentages (very few figures in the monograph are not of these types) where the base is below 10,000. The figure of 10,000 is a rough rule of thumb suggested from the work of Hansen, Hurwitz, Bershad, 1960, on the quality of census data (cf. Fellegi, 1967, pp. 6-8, 24). As mentioned above, no emphasis is placed on actual totals, and instead percentages and ratios are calculated. In interpreting these percentages and ratios the tendency is to look for systematic patterns which show up in various 'breakdowns' of the data by areas and sub-populations before concluding that preliminary indications of the statistics are possibly genuine. These and other steps have been taken in the effort to extract useful information from the sample in the absence of concrete indications as to the specific figures needing corrections.

B.3.2 THE PROBLEM OF NON-RESPONDENTS – "Non-respondents" means persons missed entirely by the census (and who would have been eligible for sampling had they been enumerated) as well as those for whom there is an inadequate record of migration status. The latter fall into four groups: (1) those who gave no reply to the migration although they fell into the sample; (2) those who indicated a move but failed to indicate the 1956 place of residence; (3) those who indicated a move from rural residence in 1956 but failed to indicate whether this was a farm or a non-farm residence;

and (4) those who fell into the sample and may have answered the migration question but whose records have been mislaid in office processing. There is no information on those missed entirely by the census. Those in category (1) are excluded in this monograph from all calculations, those in category (2) are excluded from all calculations where 1956 place of residence is shown, those in category (3) are excluded from all calculations where 1956 residence by rural farm and rural non-farm is shown, and those in category (4) are excluded from the basic calculations underlying the monograph calculations.

As mentioned at the beginning of this Section, the non-respondents raise a problem in this monograph to the extent that their distributions on the census-enumerated characteristics (particularly migration status and attributes with which migration status is cross-classified) differ from those of the respondents. It is important to remember that the magnitude of the problem depends on the number of the non-respondents relative to the number of respondents. If all non-respondents are a very small fraction of the respondents, then the tabulated distributions may not be significantly altered by introduction of the data for non-respondents, even though the two groups may differ quite markedly. Lacking some re-enumeration procedure in which the required data are gathered from a sample of the non-respondents, it is difficult to gauge the magnitude of the bias in the statistics due to non-respondents. Some crude indications of bias may be obtained by comparing the distributions of respondents with those of non-respondents on characteristics where both distributions are 'known' by full-count census enumeration but this procedure is sound only if the compared distributions are correlated with the ones 'known' only by means of the Population Sample. Even when the procedure is sound it is effective mainly in alerting the analyst to the likely existence of bias in the sample statistics, and it gives no measure of the differences between respondents and non-respondents on such statistics. Among the basic tabulations available for completion of this monograph, only parts of the data needed to make full comparisons of the type indicated above are available. Tables B.1 to B.10 show the relative sizes of 'not stated' cells in selected migration tables and selected characteristic distributions for 'not stated' cases.

Tables B.1 to B.5 show the sizes of non-respondent groups relative to selected base population totals. For Canada (broken down by urban, rural farm and rural non-farm) the aggregate in all three non-respondent categories comprised roughly seven per cent of the total sample. When considering broad age groups by sex within each of the above-mentioned areal categories, only one of the age groups tends to show 'aggregate non-respondent percentages' as high as 10 per cent. With one exception, the provinces do not show a significantly high level of variation about the above-mentioned norm of seven per cent. Now the 'true' migration ratio for any of these area-sex-age

groups is a weighted average of the corresponding ratios for respondents and non-respondents. The weight of each of these two categories is roughly its proportion of the sample. Since for non-respondents this proportion is typically 0.07, it may be concluded that the lack of data for the non-respondents will usually create a minor distortion of the ratio estimated from respondents' data only. This conclusion may not, of course, apply to each and every area-sex-age group mentioned or to more detailed tabulation categories than those shown in Tables B.1 to B.5; nor does the conclusion imply that the respondent data accurately reflect the 'true' migration ratios for *respondents* (this is a separate issue).

Tables B.6 to B.10 compare respondents with the aggregate of all categories of non-respondents in regard to their percentage distributions on a number of variables. The aggregation of all non-respondent categories is used because (a) well over 90 per cent of the non-respondents were persons who gave no report on their five-year mobility status, and (b) the remaining 10 per cent of non-respondents (movers whose reports were incomplete as to the 1956 place of residence) were usually of such small numbers as to provide a poor basis for the calculation of reliable percentage distributions. Typically, the non-respondents were, in comparison with the respondents, more heavily concentrated in the 15-34 age group, more likely to be single, more likely to have had at least secondary education and more likely to have been speaking English only or to have been bilingual (English and French). Noting these findings in regard to marital status and educational attainment, bearing in mind the relevant discussions in Chapter Three (Sections 3.1.2 and 3.3), it might be stated as a tentative hypothesis that the non-respondents were more mobile than the respondents. If so, the true rates of migration in the sampling universe have been *slightly* (see the previous paragraph) underestimated; the most serious underestimation being in the 15-34 age group. Thus the 'true' migration ratios would show even more prominent peaks in this age range than those indicated in Chapter Three.

Table B.1 – Complete Non-respondents[a] to the Five-Year Migration Question as a Percentage of the Reporting Population, by Sex and Age, Canada, Urban and Rural, 1956-61

Sex and age	All areas	Type of residence in 1961		
		Urban	Rural non-farm	Rural farm
Canada	**5.8**	**6.2**	**5.3**	**3.9**
5-14 years	4.0	4.3	4.2	2.5
15-19 "	9.8	10.0	10.4	8.4
20-24 "	7.3	7.6	7.0	6.0
25-29 "	6.7	7.2	6.0	4.4
30-34 "	6.0	6.4	5.2	3.7
35-44 "	5.4	5.8	4.9	3.1
45-64 "	5.3	5.9	4.5	3.1
65 years and over	6.0	6.6	4.6	4.4
Males	**5.7**	**6.1**	**5.3**	**4.0**
5-14 years	4.0	4.3	4.1	2.6
15-19 "	9.8	10.1	10.2	8.3
20-24 "	7.3	7.6	7.0	6.1
25-29 "	7.0	7.4	6.3	4.6
30-34 "	5.9	6.3	5.3	3.8
35-44 "	5.4	5.9	4.9	3.1
45-64 "	5.1	5.7	4.5	3.0
65 years and over	5.5	6.2	4.4	4.1
Females	**5.8**	**6.3**	**5.4**	**3.8**
5-14 years	4.1	4.3	4.3	2.4
15-19 "	9.9	9.9	10.6	8.5
20-24 "	7.3	7.6	6.9	5.7
25-29 "	6.5	6.9	5.8	4.1
30-34 "	6.1	6.6	5.1	3.6
35-44 "	5.4	5.8	4.9	3.1
45-64 "	5.5	6.1	4.6	3.2
65 years and over	6.4	7.0	4.8	4.7

[a] "Complete non-respondents" refers to persons who fell into the sample but who gave no report as to their residence five years before the census.

SOURCE: Unpublished tabulations of the 1961 Population Sample.

Table B.2 – Complete Non-respondents[a] to the Five-Year Migration Question as a Percentage of the Reporting Population by Sex, Canada and Provinces, Urban and Rural, 1956-61

Sex and province	All areas	Type of residence in 1961		
		Urban	Rural non-farm	Rural farm
Canada	**5.8**	**6.2**	**5.3**	**3.9**
Newfoundland	3.5	4.0	2.9	3.0
Prince Edward Island	5.8	6.1	6.8	4.5
Nova Scotia	6.6	6.9	6.3	5.7
New Brunswick	12.3	8.2	16.1	14.7
Quebec	4.8	5.0	4.3	3.8
Ontario	7.2	8.0	4.3	3.7
Manitoba	3.6	3.8	2.9	3.2
Saskatchewan	3.3	4.0	2.9	2.9
Alberta	4.0	4.5	3.9	2.9
British Columbia	5.4	5.2	6.4	5.1
Males	**5.7**	**6.1**	**5.3**	**4.0**
Newfoundland	3.3	3.8	2.8	2.9
Prince Edward Island	5.5	5.7	6.8	4.3
Nova Scotia	6.5	6.9	6.3	5.8
New Brunswick	12.1	8.0	15.7	14.5
Quebec	4.8	5.0	4.3	3.9
Ontario	7.0	7.9	4.3	3.8
Manitoba	3.5	3.8	2.9	3.2
Saskatchewan	3.3	3.9	2.9	3.1
Alberta	4.0	4.4	4.0	3.1
British Columbia	5.4	5.2	6.4	5.2
Females	**5.8**	**6.3**	**5.4**	**3.8**
Newfoundland	3.6	4.2	3.0	3.1
Prince Edward Island	6.0	6.5	6.8	4.8
Nova Scotia	6.6	7.0	6.3	5.7
New Brunswick	12.4	8.4	16.5	14.9
Quebec	4.8	5.0	4.3	3.7
Ontario	7.3	8.2	4.4	3.7
Manitoba	3.6	3.8	2.9	3.2
Saskatchewan	3.3	4.1	2.9	2.6
Alberta	4.0	4.5	3.8	2.7
British Columbia	5.4	5.2	6.4	4.9

[a] See Table B.1, footnote[a].

SOURCE: Unpublished tabulations of the 1961 Population Sample.

Table B.3 – Complete Non-respondents[a] to the Five-Year Migration Question as a Percentage of the Reporting Population, by Sex, Census Metropolitan Areas in Canada, 1956-61

Metropolitan area	Both sexes	Males	Females
Calgary	4.2	4.2	4.3
Edmonton	4.4	4.2	4.5
Halifax	4.9	5.0	4.8
Hamilton	3.3	3.2	3.3
Kitchener	3.1	3.1	3.0
London	3.4	3.2	3.6
Montreal	5.7	5.7	5.6
Ottawa	4.7	4.6	4.8
Quebec	4.2	4.1	4.2
Saint John	4.1	3.8	4.3
St. John's	4.8	4.6	5.0
Sudbury	4.6	4.6	4.7
Toronto	15.1	15.0	15.3
Vancouver	5.0	5.0	5.0
Victoria	6.0	5.6	6.3
Windsor	3.4	3.2	3.6
Winnipeg	3.9	3.9	3.9

[a] See Table B.1, footnote[a].

SOURCE: Unpublished tabulations of the 1961 Population Sample.

Table B.4 – Five-Year Movers Who Failed to Report 1956 Place of Residence as a Percentage of All Five-Year Movers, by Sex, Canada and Provinces, 1956-61

Sex and province	All areas	Type of residence in 1961		
		Urban	Rural non-farm	Rural farm
Canada	**0.4**	**0.4**	**0.6**	**0.9**
Newfoundland	0.6	0.7	0.5	–
Prince Edward Island	0.8	0.5	1.0	0.9
Nova Scotia	0.5	0.4	0.6	0.5
New Brunswick	0.6	0.5	0.7	1.4
Quebec	0.4	0.4	0.4	0.6
Ontario	0.4	0.4	0.6	1.0
Manitoba	0.6	0.4	1.0	1.4
Saskatchewan	0.8	0.4	1.2	1.4
Alberta	0.5	0.4	1.1	0.9
British Columbia	0.3	0.3	0.4	0.2
Males	**0.4**	**0.4**	**0.6**	**0.9**
Newfoundland	0.6	0.7	0.5	–
Prince Edward Island	0.9	0.5	1.3	1.1
Nova Scotia	0.5	0.4	0.6	0.3
New Brunswick	0.6	0.5	0.6	0.9
Quebec	0.4	0.4	0.4	0.6
Ontario	0.4	0.4	0.6	1.0
Manitoba	0.6	0.4	1.1	1.4
Saskatchewan	0.8	0.5	1.2	1.3
Alberta	0.6	0.4	1.2	1.0
British Columbia	0.3	0.3	0.3	0.2
Females	**0.4**	**0.4**	**0.6**	**0.9**
Newfoundland	0.6	0.7	0.5	–
Prince Edward Island	0.7	0.6	0.8	0.7
Nova Scotia	0.5	0.5	0.5	0.8
New Brunswick	0.6	0.5	0.7	2.0
Quebec	0.4	0.4	0.4	0.5
Ontario	0.4	0.4	0.6	0.9
Manitoba	0.5	0.3	0.9	1.4
Saskatchewan	0.8	0.4	1.1	1.6
Alberta	0.5	0.4	1.0	0.8
British Columbia	0.3	0.3	0.4	0.3

SOURCE: Unpublished tabulations of the 1961 Population Sample.

Table B.5 – Five-Year Movers with Rural Place of Origin Who Failed to Give the Farm or Non-farm Status of the Place of Origin, as a Percentage of All Five-Year Movers with Rural Places of Origin, by Sex, Canada and Provinces, 1956-61

Sex and province	All areas	Type of residence in 1961		
		Urban	Rural non-farm	Rural farm
Canada	**11.2**	**13.6**	**8.0**	**8.3**
Newfoundland	15.9	22.3	10.6	3.7
Prince Edward Island	11.2	17.4	5.9	11.2
Nova Scotia	11.7	16.9	7.7	5.9
New Brunswick	11.8	11.5	11.0	21.1
Quebec	13.0	14.5	10.2	9.0
Ontario	10.9	13.0	7.8	8.8
Manitoba	12.1	15.2	7.9	6.0
Saskatchewan	8.8	11.0	5.6	8.1
Alberta	10.6	12.8	6.9	7.7
British Columbia	10.0	12.8	7.2	6.9
Males	**10.3**	**12.6**	**7.3**	**7.8**
Newfoundland	14.5	21.7	9.1	—
Prince Edward Island	9.8	15.5	5.2	10.4
Nova Scotia	9.9	15.2	6.3	2.6
New Brunswick	10.6	9.4	10.7	19.4
Quebec	12.1	13.6	9.6	7.4
Ontario	10.3	12.2	7.5	8.2
Manitoba	11.4	14.9	6.9	5.4
Saskatchewan	8.0	9.9	4.8	9.0
Alberta	9.8	12.1	6.0	7.1
British Columbia	9.0	11.4	6.7	6.7
Females	**12.1**	**14.5**	**8.6**	**9.0**
Newfoundland	17.2	22.9	12.1	7.4
Prince Edward Island	12.5	18.9	6.6	11.8
Nova Scotia	13.4	18.4	9.2	9.1
New Brunswick	12.9	13.3	11.3	22.8
Quebec	13.8	15.3	10.8	10.4
Ontario	11.6	13.8	8.1	9.4
Manitoba	12.8	15.5	9.1	6.8
Saskatchewan	9.5	12.2	6.5	7.2
Alberta	11.4	13.5	7.7	8.5
British Columbia	11.1	14.1	7.7	7.1

SOURCE: Unpublished tabulations of the 1961 Population Sample.

Table B.6 – Sex Distributions by Age for Respondents and Non-respondents to the Five-Year Migration Question, Canada, Urban and Rural, 1956-61

Sex and age	Respondents				Non-respondents			
	All areas[b]	Urban	Rural non-farm	Rural farm	All areas[b]	Urban	Rural non-farm	Rural farm
All ages	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Males	50.3	49.3	51.6	54.3	49.3	48.4	50.7	54.7
Females	49.7	50.7	48.4	45.7	50.7	51.6	49.3	45.3
5-14 years	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Males	51.1	51.0	51.2	51.5	50.7	50.5	50.3	53.3
Females	48.9	49.0	48.8	48.5	49.3	49.5	49.7	46.7
15-19 years	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Males	51.0	49.5	51.8	56.1	49.8	48.5	50.5	55.2
Females	49.0	50.5	48.2	43.9	50.2	51.5	49.5	44.8
20-24 years	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Males	49.1	47.4	49.3	61.5	47.9	46.9	47.2	59.0
Females	50.9	52.6	50.7	38.5	52.1	53.1	52.8	41.0
25-29 years	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Males	49.9	49.4	50.2	53.8	51.9	51.8	51.6	54.7
Females	50.1	50.6	49.8	46.2	48.1	48.2	48.4	45.3
30-34 years	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Males	50.2	49.9	51.1	51.5	49.6	48.9	52.1	52.5
Females	49.8	50.1	48.9	48.5	50.4	51.1	47.9	47.5
35-44 years	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Males	49.5	48.8	51.3	51.3	49.5	49.0	51.1	51.9
Females	50.5	51.2	48.7	48.7	50.5	51.0	48.9	48.1
45-64 years	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Males	50.9	49.3	53.1	56.6	48.8	47.6	52.2	55.2
Females	49.1	50.7	46.9	43.4	51.2	52.4	47.8	44.8
65 years and over	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Males	48.9	45.8	53.4	59.3	44.9	42.6	51.1	54.9
Females	51.1	54.2	46.6	40.7	55.1	57.4	48.9	45.1

[a] Non-respondents include 'complete' non-respondents, persons who indicated a move but failed to show the 1956 place of residence, and persons who showed 1956 rural origin but failed to indicate whether this was farm or non-farm.

[b] Figures may not add to totals due to rounding error.

SOURCE: Unpublished tabulations of the 1961 Population Sample.

Table B.7 – Marital Status Distributions for Respondents and Non-respondents[a] to the Five-Year Migration Question, by Sex and Age, Canada, 1956-61

Sex and age	Respondents by marital status				Non-respondents by marital status			
	Total[b]	Single	Married	Widowed and divorced	Total[b]	Single	Married	Widowed and divorced
Canada	**100.0**	**23.9**	**69.6**	**6.5**	**100.0**	**36.7**	**55.6**	**7.7**
15-19 years	100.0	94.9	5.1	0.0	100.0	95.7	4.3	0.0
20-24 "	100.0	52.4	47.4	0.2	100.0	56.4	43.4	0.2
25-29 "	100.0	19.5	80.0	0.5	100.0	29.8	69.4	0.8
30-34 "	100.0	11.3	87.8	0.9	100.0	21.4	77.5	1.2
35-44 "	100.0	8.3	89.7	2.0	100.0	16.1	81.0	2.9
45-64 "	100.0	8.5	83.6	7.9	100.0	14.1	73.9	12.0
65 years and over	100.0	8.4	58.0	33.6	100.0	11.1	46.2	42.6
Males	**100.0**	**27.1**	**69.7**	**3.2**	**100.0**	**41.9**	**53.7**	**4.4**
15-19 years	100.0	98.7	1.3	—	100.0	98.9	1.1	0.0
20-24 "	100.0	67.6	32.4	0.1	100.0	72.4	27.6	0.1
25-29 "	100.0	25.9	73.9	0.2	100.0	38.1	61.4	0.5
30-34 "	100.0	14.1	85.4	0.5	100.0	26.6	72.7	0.7
35-44 "	100.0	9.6	89.5	0.9	100.0	18.2	79.5	2.2
45-64 "	100.0	8.8	88.1	3.2	100.0	16.3	77.7	6.0
65 years and over	100.0	8.6	72.5	18.9	100.0	12.7	59.4	27.9
Females	**100.0**	**20.6**	**69.6**	**9.8**	**100.0**	**31.6**	**57.5**	**10.8**
15-19 years	100.0	91.0	9.0	0.0	100.0	92.4	7.6	0.1
20-24 "	100.0	37.7	62.0	0.3	100.0	41.6	58.1	0.3
25-29 "	100.0	13.0	86.2	0.8	100.0	20.7	78.1	1.2
30-34 "	100.0	8.4	90.3	1.4	100.0	16.2	82.2	1.6
35-44 "	100.0	7.1	89.8	3.1	100.0	14.0	82.4	3.6
45-64 "	100.0	8.2	79.0	12.8	100.0	12.1	70.2	17.7
65 years and over	100.0	8.2	44.1	47.7	100.0	9.9	35.4	54.7

[a] See Table B.6, footnote [a].
[b] Figures may not add to totals due to rounding error.

SOURCE: Unpublished tabulations of the 1961 Population Sample.

Table B.8 – Educational Attainment Distributions for Respondents and Non-respondents[a] to the Five-Year Migration Question, by Sex and Age Group 25-34, Canada, 1956-61

Sex and age	Total	Elementary or less	Secondary	University
	Respondents by educational attainment			
Canada	100.0	46.0	48.0	6.0
25-34 years	100.0	36.8	55.7	7.5
Males	100.0	49.2	43.2	7.6
25-34 years	100.0	39.6	50.9	9.5
Females	100.0	42.8	52.6	4.6
25-34 years	100.0	34.0	60.4	5.6
	Non-respondents by educational attainment			
Canada	100.0	44.3	49.9	5.8
25-34 years	100.0	34.7	57.9	7.4
Males	100.0[b]	47.3	45.5	7.2
25-34 years	100.0	37.7	53.0	9.2
Females	100.0	41.4	54.1	4.5
25-34 years	100.0	31.7	62.8	5.5

[a] See Table B.6, footnote [a].
[b] Figures do not add to totals due to rounding error.

SOURCE: Unpublished tabulations of the 1961 Population Sample.

Table B.9 – Occupational Distributions for Male Respondents and Non-respondents[a] to the Five-Year Migration Question, Canada, 1956-61

Occupation group	Respondents[b]	Non-respondents[b]
Managerial	10.6	8.6
Professional and technical	7.5	6.9
Clerical	7.2	7.6
Sales	5.9	5.6
Service and recreation occupations	7.5	7.9
Transport and communication occupation	7.8	7.7
Farmers and farm workers	12.8	8.3
Other primary occupations	3.6	4.0
Craftsmen, production process and related workers	29.9	27.3
Labourers, not elsewhere classified	6.3	6.8
Occupation not stated	1.1	9.4

[a] See Table B.6, footnote [a].
[b] Figures do not add to 100.0 due to rounding error.

SOURCE: Unpublished tabulations of the 1961 Population Sample.

Table B.10 – Language Group Distribution for Respondents and Non-respondents[a] to the Five-Year Migration Question, by Sex, Canada, Urban and Rural, 1956-61

Type of residence and language group	Respondents by sex[b]			Non-respondents by sex[b]		
	Both sexes	Males	Females	Both sexes	Males	Females
Canada	100.0	100.0	100.0	100.0	100.0	100.0
English only	67.4	67.4	67.4	68.2	67.9	68.4
French only	18.2	16.8	19.6	16.2	15.4	17.0
Both French and English	13.4	15.1	11.8	14.2	15.7	12.8
Neither French nor English	1.0	0.8	1.2	1.4	1.0	1.9
Urban	100.0	100.0	100.0	100.0	100.0	100.0
English only	67.1	66.9	67.2	70.9	70.6	71.2
French only	16.3	14.5	18.1	12.4	11.4	13.5
Both French and English	15.7	18.0	13.6	15.2	17.1	13.4
Neither French nor English	0.9	0.6	1.2	1.5	1.0	1.9
Rural non-farm	100.0	100.0	100.0	100.0	100.0	100.0
English only	68.5	68.5	68.5	59.8	60.2	59.4
French only	19.8	18.9	20.8	25.3	24.3	26.3
Both French and English	9.9	10.9	8.7	13.1	14.2	12.0
Neither French nor English	1.8	1.7	2.0	1.8	1.4	2.2
Rural farm	100.0	100.0	100.0	100.0	100.0	100.0
English only	67.5	68.0	66.9	61.5	62.1	60.8
French only	25.9	25.2	26.7	29.9	29.2	30.7
Both French and English	6.3	6.6	5.9	8.1	8.4	7.7
Neither French nor English	0.4	0.2	0.6	0.5	0.3	0.8

[a] See Table B.6, footnote [a].
[b] Figures may not add to total due to rounding error.

SOURCE: Unpublished tabulations of the 1961 Population Sample.

The following are a few more detailed remarks about the patterns shown by these Tables.

Persons who fell into the sample but who failed to provide any information about their five-year mobility status comprised slightly less than six per cent of the total sample (Table B.1). For the urban, rural non-farm and rural farm parts of Canada the actual percentages of complete non-response were six per cent, five per cent and four per cent, respectively, with negligible differences between males and females. Among the eight selected age groupings of persons aged five and over in 1961, percentages markedly above the six per cent level are observed mainly for age groups 15-19, 20-24 and 25-29. For all of Canada, the percentage of the sample which contained complete non-respondents reached as high as 10 per cent for the 15-19 age group only.

The corresponding percentages for the provinces (Table B.2) did not vary greatly about the Canada-level figures. The only prominent exception to this statement in Table B.2 pertains to the rural non-farm and rural farm figures for New Brunswick, which were more than twice as high as the corresponding figures for Canada as a whole. In both of these parts of New Brunswick, roughly 15 per cent of the sample failed to provide any information about their five-year mobility status. Of course, a breakdown of the figures in Table B.2 by age may reveal other highly atypical provinces. Generally, the higher-than-average percentages are shown by the Maritime Provinces and Ontario, while consistently lower-than-average percentages are shown for Newfoundland and the Prairie Provinces.

Among the Census Metropolitan Areas (Table B.3) the percentages of complete non-respondents (in relation to the total sample) were, with one major exception, distinctly below the Canada average. Thus, on the whole, the problem of complete non-response to the migration question was not as severe in the Census Metropolitan Areas as in the remainder of Canada. The outstanding exception was the Toronto MA, where 15 per cent of the sample failed to report their five-year movement status. Given the tentative hypothesis set forth in the paragraph preceding the last, it might further be suggested that the 'true' migration ratios for Toronto MA may have been markedly underestimated.

Tables B.4 and B.5 deal with the other two groups of non-respondents. With minor exceptions, the persons who reported a move but failed to indicate an area of 1956 residence were one per cent or less of all persons who reported a move. In contrast, a considerable percentage of those who reported rural residence in 1956 failed to state whether this was rural farm or rural non-farm. For Canada as a whole this latter percentage was eight per cent among all persons alive in 1956, and it reached as high as 13 per cent among those aged 15-19 in 1961. Again, the vast majority of the provinces were close to the eight per cent level, with the marked exceptions being New Brunswick (21 per cent), Prince Edward Island (11 per cent), and Newfoundland (three per cent).

Tables B.6 to B.10 compare the respondents with the aggregate of the three non-respondent categories as regards their percentage distributions by sex, marital status, education, occupation and language. Age breakdowns are not shown for the last two variables because they show no marked divergences from the pattern for all ages taken together. In regard to the sex, marital status and educational attainment distributions, the main divergences between the respondents and the non-respondents show up in the 25-34 age range. It is notable that the principal difference between the two groups on occupation distribution pertains to the 'occupation not stated'

category, where some 10 per cent of non-respondents were concentrated. Only two per cent of the respondents failed to give a classifiable report on their occupation.

FOOTNOTES TO APPENDIX B

[1] The discussion of characteristics and data-processing operations of the 1961 Population Sample draws partly on the work of Sylvia Wargon, 1967.

[2] The groups excluded from the sample universe are probably highly mobile, so that the sample data should tend to understate slightly the level of mobility in Canada. Since the sample universe comprised 96 per cent of Canada's population aged five and over in 1961 (Wargon, 1967), the degree of understatement is likely to be very small for large aggregates of population.

[3] It is not clear from the information available to the writer whether there were any persons in this group who may have been intra-municipal movers. All persons falling into this group were taken to be inter-municipal movers, probably on the assumption that intra-municipal movers would almost certainly have checked the 'same city' section of the response area in the migration question.

Appendix C

LIFE TABLE SURVIVAL RATIO ESTIMATES OF NET MIGRATION

The net migration estimates shown in Charts 2.4 and 2.5 and in Tables 5.1, 5.2 and 5.5 are calculated by means of the survival ratio technique. Let "$P_{x,t}$" and "$P_{x+a,\ t+a}$" be the populations aged x at time t and aged $x+a$ at time $t+a$, respectively. Let "$R_{x,t}$" be the proportion of $P_{x,t}$ expected to survive over the period from t to $t+a$; and this is called the "survival ratio". The survival ratio estimate of net migration is

$$N_{x,t} = P_{x+a,\ t+a} - R_{x,t} \cdot P_{x,t} \qquad [1]$$

The general properties of this estimator and its limitations are described at length by Lee, 1957, and there is a large volume of relevant critical literature (see the bibliography in Stone, 1967b) to which the interested reader may refer.

There are various ways of obtaining values for the survival ratios, $R_{x,t}$. Among the existing alternatives the so-called Census Survival Ratio is usually preferable. It does not quite fit the definition set forth above because it contains a built-in adjustment factor which frequently helps it to nullify *some* of the distortion of the net migration ratio estimate created by census enumeration errors (in the P-values). Due to this built-in adjustment (discussed at length by Lee, 1957, and first exposited in detail by Hamilton and Henderson, 1944), net migration ratio estimates prepared with the Census Survival Ratio tend to show smoother and more reasonable age profiles of net migration *ratios* than those prepared with the Life Table Survival Ratio.

In this monograph the Life Table Survival Ratio has been used, mainly because the Canadian census statistics do not permit the calculation of Census Survival Ratios (which require a country where there is no age selectivity in net external migration). The calculation of the Life Table Survival Ratios for major regions of Canada from 1901-11 to 1951-61 is described in Stone, 1967a, Appendix G, and the interested reader should consult this description which also presents the values of the calculated ratios.

The net migration estimates for 1871-81 to 1891-1901 were calculated by means of regression equations. It was observed in many cases that $N_{x,t}/P_{x,t}$ and $P_{x+a,\ t+a}/P_{x,t}$ were highly correlated. Thus the following regression equation was formed:

Estimated $N_{x,t}/P_{x,t} = h + b\,(P_{xta,\ t+a}/P_{x,t})$ [2]

with h and b being parameters to be estimated by the least squares regression technique.

Using Life Table Survival Ratio estimates of net migration for counties or census divisions, selected cities and provinces from 1901 - 11 to 1951 - 61, scatter diagrams for the correlation between $N_{x,t}/P_{x,t}$ and $P_{x+a,\ t+a}/P_{x,t}$ were constructed, and in all cases the points deviated very little from a straight line regression and indicated very high correlation. Therefore, least squares regression estimates were evaluated for h and b, and used to generate the net migration estimates for 1871 - 81, 1881 - 91 and 1891 - 1901. The estimated values of h and b are shown in Table C. 1, and derived net migration estimates are shown in Table C. 2.

Table C.1 – Regression Constants Used in Estimating Provincial Net-Migration Ratios from 1871 - 81 to 1891 - 1901

Sex and age at beginning of decade	Estimate of h[a]	Estimate of b[a]	r^2[b]
Males –			
0 - 4 years	3.55	1.02	1.00
5 - 9 "	2.15	1.01	1.00
10 - 14 "	2.52	1.01	1.00
15 - 19 "	3.07	1.01	1.00
20 - 24 "	3.79	1.01	1.00
25 - 29 "	4.30	1.02	1.00
30 - 34 "	5.31	1.02	1.00
0 years and over	10.98	1.01	1.00
Females –			
0 - 4 years	3.09	1.02	1.00
5 - 9 "	2.17	1.01	1.00
10 - 14 "	2.37	1.01	1.00
15 - 19 "	3.14	1.01	1.00
20 - 24 "	3.82	1.01	1.00
25 - 29 "	4.01	1.02	1.00
30 - 34 "	5.22	1.03	1.00
0 years and over	9.21	1.01	1.00

[a] See equation [2] in the text of Appendix C. The estimates were calculated from figures for the ratios $N_{x,t}/P_{x,t}$ and $P_{x+a,\ t+a}/P_{x,t}$ in regard to nine provinces (Newfoundland excluded). $N_{x,t}$ refers to the net migration estimates described in the text of this Appendix; $P_{x,t}$ and $P_{x+a,\ t+a}$ are census statistics. The periods covered by these data are decades from 1901 - 11 to 1951 - 61, so that each estimate is based on 54 observations.

[b] This is the squared product-moment coefficient of correlation between the two ratios mentioned in footnote[a]. The very high value of r^2 (rounded to two decimal places it is perfect) reflects the very slight variation among the regional survivorship ratios used in estimating $N_{x,t}$.

SOURCES: Camu, Weeks and Sametz, 1964, Table 31; 1961 Census, DBS 99 - 514, Table 2; 1931 Census, Vol. I, Table 8; Stone, 1967[a], Table L.4; Province of Quebec, *Statistical Yearbook* (annual), 1923, p. 40.

Table C.2 – Net Intercensal Migration Ratios[a] for Provinces, by Sex and Selected Age Groups, 1871-81 to 1951-61

Sex and province	1871-81[b]	1881-91[b]	1891-1901[b]	1901-11[c]	1911-21[c]	1921-31[c]	1931-41[c]	1941-51[c]	1951-61[c]
	Population aged 10 and over at the end of each decade								
	A	B	C	D	E	F	G	H	I
Males –									
Newfoundland	–	–	–	–	–	–	–	–	– 1.7
Prince Edward Island	–	– 16.4	– 19.7	14.0	– 13.4[d]	– 8.9	– 1.4	– 13.2	– 10.3
Nova Scotia	– 5.7	– 12.2	– 11.0	– 0.1	– 5.2	– 13.6	1.2	– 7.0	– 3.3
New Brunswick	– 7.2	– 16.9	– 12.5	– 2.9	– 4.8	– 10.7	– 2.0	– 10.3	– 5.5
Quebec	– 9.3	– 11.6	– 9.5	5.8	– 3.6	1.6	– 0.1	– 1.2	5.7
Ontario	– 1.6	– 5.6	– 9.1	12.6	3.7	6.3	2.6	6.8	14.3
Manitoba	–	64.8	30.7	44.9	5.8	– 0.5	– 7.2	– 9.3	1.5
Saskatchewan	–	–	–	133.5	13.9	0.7	– 17.2	– 23.2	– 6.3
Alberta	–	–	–	130.2	19.7	5.4	– 5.8	– 1.2	13.5
British Columbia	–	66.6	52.4	73.8	8.8	20.2	8.8	22.3	19.9
Females –									
Newfoundland	–	–	–	–	–	–	–	–	– 4.6
Prince Edward Island	–	– 17.6	– 20.8	– 13.1	– 16.7	– 13.3	– 3.9	– 11.5	– 12.4
Nova Scotia	– 6.9	– 14.9	– 14.7	– 1.1	– 7.1	– 15.6	0.5	– 5.1	– 5.5
New Brunswick	– 8.9	– 18.1	– 14.4	– 4.8	– 6.9	– 12.4	– 3.8	– 7.1	– 7.8
Quebec	– 9.8	– 13.3	– 11.4	2.9	– 2.8	0.1	0.3	0.4	4.6
Ontario	– 2.1	– 6.5	– 9.3	6.0	4.3	3.8	2.6	7.6	13.6
Manitoba	–	61.3	27.5	36.6	8.6	– 3.0	– 6.3	– 7.5	– 1.0
Saskatchewan	–	–	–	113.4	22.1	– 2.4	– 17.3	– 23.4	– 9.1
Alberta	–	–	–	113.5	28.3	1.7	– 5.4	– 0.8	12.3
British Columbia	–	35.3	40.8	60.8	31.0	16.7	13.1	25.6	17.5

	Population aged 20 - 39 at the end of each decade								
	J	K	L	M	N	O	P	Q	R
Males —									
Prince Edward Island	—	− 38.4	− 47.6	− 47.9	− 33.8[d]	− 22.6	− 4.3	− 26.0	− 29.9
Nova Scotia	− 19.8	− 29.2	− 26.5	− 7.1	− 6.0	− 24.8	1.9	− 12.5	− 9.8
New Brunswick	− 22.2	− 36.0	− 29.1	− 16.3	− 7.2	− 21.7	− 6.0	− 22.8	− 19.5
Quebec	− 19.5	− 21.6	− 18.5	2.4	− 6.2	− 0.4	0.5	− 4.3	5.4
Ontario	− 12.6	− 16.2	− 21.5	17.4	12.7	10.5	4.3	9.8	18.5
Manitoba	—	75.9	32.4	77.2	19.7	1.2	− 8.6	− 12.8	1.1
Saskatchewan	—	—	—	213.5	34.9	6.8	− 26.5	− 38.1	− 16.8
Alberta	—	—	—	192.9	37.3	14.0	− 4.8	0.5	18.2
British Columbia	—	107.7	77.7	95.9	26.8	26.2	16.4	26.0	24.1
Females —									
Prince Edward Island	—	− 35.3	− 42.8	− 39.3	− 36.2	− 30.3	− 12.0	− 28.0	− 33.6
Nova Scotia	− 18.6	− 28.9	− 30.1	− 7.9	− 12.0	− 30.0	0.7	− 9.7	− 13.4
New Brunswick	− 21.5	− 31.8	− 27.7	− 13.1	− 10.4	− 24.2	− 9.5	− 16.1	− 20.2
Quebec	− 24.0	− 20.1	− 17.5	2.0	− 4.0	1.6	2.3	0.7	7.1
Ontario	− 7.4	− 15.1	− 18.9	10.3	10.4	7.9	4.9	11.7	19.5
Manitoba	—	65.2	26.7	66.6	16.7	− 1.5	− 8.3	− 7.5	− 0.3
Saskatchewan	—	—	—	203.7	37.9	− 2.2	− 34.5	− 39.0	− 18.7
Alberta	—	—	—	186.2	41.5	7.5	− 7.0	− 0.3	17.7
British Columbia	—	55.0	57.9	86.0	37.0	23.5	21.9	30.4	21.2

[a] The net migration ratio is 100 times the estimated net migration divided by the average of the beginning-of-decade and end-of-decade populations for the relevant age cohort. See equation [1] of this Appendix.

[b] Estimates prepared by means of the regression technique described in this Appendix.

[c] Life table survival ratio estimates; see the discussion in preceding text.

[d] Figures adjusted to take into account the estimated impact on each province of war deaths, war non-returnees and influenza epidemic victims. Essentially war deaths and non-returnees were all assumed to be males aged 10 - 29 in 1911. With the exception of Quebec province, these persons were distributed over provinces according to the provincial shares of the national average 1911 and 1921 populations. Quebec received one half the amount it would get if it had a share equal to its share of the national population. An estimated 21 per cent of the influenza victims were born during the decade, while 40 per cent of the remainder were assumed to be aged 10 - 29 in 1911. The influenza victims were evenly distributed by sex; 90,000 war deaths and non-returnees and 21,000 influenza victims were covered by the adjustment. These deaths were not reflected by the Life Table Survival Ratio.

SOURCES: Same as Table C.1.

As mentioned above, the Census Survival Ratio (CSR) is generally preferable to the Life Table Survival Ratio (LTSR), but the former may not be calculated from the Canadian census statistics. The preference for CSRs over LTSRs for use with equation [*1*] is most clearly justified when net migration *ratios* are being calculated.

McInnis, 1968[b], has been exploring the possibility of developing suitable Canadian CSRs from the United States and Canadian census data on Canadian-born persons. In this work the assumption is made that the pattern of age-group differentials in census enumeration errors is roughly similar between the censuses of these two countries. This assumption (applied to the United States white population) does not seem to be seriously at variance with the available evidence (Fellegi, 1968; Zelnick, 1965). On this assumption the ratio of the United States CSRs to LTSRs (for a given sex-age group of the white population) should yield a useful, though not fully adequate, adjustment factor for the Canadian LTSRs. It is likely that some improvement in the age profile of net migration ratios will be obtained (relative to that yielded by LTSRs) through the use of the above-mentioned adjustment factors. The procedure involves first the calculation of estimated CSRs for Canadian regions.

Let "L_u" refer to the United States life table survival ratio, for a given sex-age group and period in regard to the white population;

"S_u" refer to the corresponding United States census survival ratio;

"L_i" be the corresponding life table survival ratio for a region of Canada.

A first approximation to the Census Survival Ratio for this Canadian region is:

$$S_i \cong L_i \ (S_u / L_u) \qquad [3]$$

Equation [*3*] carries the United States-based adjustment factor down to the regional level, assuming that the age pattern of enumeration error does not vary much among the five major Canadian regions for which Life Table Survival Ratios are available (Stone, 1967[a], Table L.4). No data are at present available for checking this somewhat stronger form of McInnis' assumption. Even if the weaker and the stronger versions of the assumption are correct, equation [*3*] still would not provide adjustment for the *magnitudes* of census enumeration error at the national and regional levels. Thus equation [*3*] is but a rough approximation to the desired region-specific Census Survival Ratio (another approximation will be presented by M.V. George in the companion volume), and the hope is that the approxi-

mation will yield some smoothening of that age profile of provincial net migration ratios which is calculated from Life Table Survival Ratios.

Let "SNr_i" be the net migration ratio calculated using the CSR and "LNr_i" be the corresponding ratio based on the LTSR (both using equation [*1*]). It is easily shown that

$$SNr_i = LNr_i + (L_i - S_i) \qquad [4].$$

Thus we can get an estimate SNr_i from the above-mentioned approximation to S_i. Table C.3 shows the values of SNr_i derived from equation [*4*]. The table of values for L_i is given in the census monograph on urban development (Stone, 1967[a], Table L.4).

Table C.3 – Adjusted[a] Net-Migration Ratio[b] Estimates for the Age Group 20-39 by Sex, Canada and Provinces, 1921-31 to 1951-61

Sex and province	1921-31	1931-41	1941-51	1951-61
	Population aged 20-39 at the end of each decade			
Males –				
Prince Edward Island	– 24.2	– 5.1	– 27.6	– 23.6
Nova Scotia	– 27.3	1.9	– 13.8	– 7.8
New Brunswick	– 23.7	– 3.7	– 21.1	– 12.3
Quebec	0.5	– 1.2	– 1.6	8.2
Ontario	9.1	3.4	11.8	24.0
Manitoba	1.1	– 11.6	– 13.2	4.1
Saskatchewan	7.2	– 25.2	33.1	– 11.9
Alberta	17.3	– 7.1	2.0	23.2
British Columbia	33.5	14.4	28.7	32.1
Females –				
Prince Edward Island	– 33.4	– 11.7	– 26.4	– 28.2
Nova Scotia	– 32.3	– 1.1	– 13.2	– 12.1
New Brunswick	– 25.3	– 8.8	– 16.0	– 18.3
Quebec	– 3.0	– 1.3	1.4	6.0
Ontario	3.8	2.9	11.7	23.2
Manitoba	– 5.2	– 11.0	– 11.4	– 2.2
Saskatchewan	– 2.2	– 25.2	– 34.4	– 17.0
Alberta	6.2	– 7.4	– 1.0	19.4
British Columbia	20.8	16.3	30.8	26.3

[a] Adjusted to partially take into account the age differentials in census enumeration error. See Appendix for explanation.

[b] See preceding text for definition of the ratio.

SOURCES: Same as Table C.1. In addition, Lee, *et al.*, 1957; Miller, 1964, Table M-4; United States Dept. of Health Education and Welfare, 1963, Table 2.2.

That the estimates in Table C.3 are more accurate than those in Table C.2 is not easily demonstrated beyond reasonable doubt; although there are certain guidelines and rough tests which one may undertake in an attempt to decide which of the two should be used in a given research

project (the nature of these guidelines and tests will be the subject of a forthcoming technical paper). One approach of unproven superiority would be to use an average of the two series. Two additional series are being developed by McInnis, 1968, and by M.V. George (for the companion volume).

Appendix D

RATIONALE FOR THE ANALYSIS OF INTER-CORRELATIONS IN CHAPTERS SEVEN AND EIGHT

D.1 THE BASIC MODEL

It is assumed here that, over a given period of time, several different causal processes are simultaneously at work allocating migrants from one place to another. The list of variables which would reflect all of these processes is assumed to be large. However, considering the rate of migration for a given area, the effects of such processes are confounded in the aggregates that are measured for the calculation of migration ratios. As a result of this confounding of the effects of a wide variety of causal processes in the measurement of migration ratios for areas, one can expect to find much statistical redundancy among a substantial list of variables drawn up for multivariate analysis of the migration ratios.

It is worth noting that the term "statistical redundancy" is being used here in two different senses—that is, reference is being made to two different kinds of redundancy. First, consider two or more different causal processes that tend to have similar symptoms. Let the processes be classified into groups A and B. It is found that by resort to A alone much of the variation in a selected symptom can be explained, and that, having done so, there is relatively little *additional* explanation available from B. But starting with B (instead of A), much of the variation in the symptom can also be explained, and A is found to provide relatively little *additional* explanation. Thus, in explaining the variation of the symptom, A and B are found to be largely redundant even though they are *different* processes. Moreover, there may be a lack of supplementary information needed to indicate which of the two processes, A or B, was really in action generating the observed variation in the symptom.

The second type of redundancy refers to the case where only one causal process is being treated. Several variables may provide partially similar manifestations of this process, and may be considered redundant to the extent of this partial similarity.

Due to the phenomenon of redundancy, it is often found that three or four well-chosen variables accomplish the vast majority of the *statistical*

explanation (of the variation in a selected 'dependent' variable) which is available from a much larger list of variables. In addition, it is very difficult to devise a clear discussion, in the common language of discourse, of the findings from a multivariate analysis unless the exposition is confined to a few key indicators. Thus, for Chapters Seven and Eight an attempt is made to find a few indicators which would do most of the work of statistical accounting that can be accomplished with a larger set containing these selected few.

There are many different ways of making this the selection of a few key indicators. The technique used here finds its underlying rationale in a theory presented by Louis Guttman, 1953, and called "image analysis". No attempt has been made to use the full apparatus of image analysis laid out by Guttman; rather, its basic rationale has been relied upon, adding to this some ingredients for the purposes of this study. The reader may refer to Guttman, 1953, for an analysis of the deep implications of the simple partial skeleton of image analysis which will now be outlined.

Consider predicting a variable y from a set of n *observed* variables $(x_1, x_2, \ldots, x_n)$ by means of a least squares regression equation. Let p be the predicted value of y. Then y can be written as

$$y = p + e \qquad [1],$$

where e is the error of prediction. For each combination of values on $(x_1, x_2, \ldots, x_n)$ there is a predicted value of y. The set of all such predicted values comprises a *partial image* of y, and the *total image* is the limit of the *partial image* as n grows large beyond bound.

It is well known that, given $(x_1, x_2, \ldots, x_n)$, p exists and is unique. Also existing and unique is the multiple correlation (the zero order correlation between p and y), which is a measure of the 'goodness' of the prediction. Depending on the degree of multicollinearity among $(x_1, x_2, \ldots, x_n)$, which is reflected in their inter-correlations, the least squares regression weights may not be unique. As Chapters Seven and Eight are built on the assumption that there is inter-correlation among the economic and social factors which may explain areal variation in migration ratios, we must accept the likelihood of high inter-correlations among $(x_1, x_2, \ldots, x_n)$. Thus, the regression weights cannot be given any definite substantive interpretation, and it will be necessary to employ a special technique (outlined below in Section D.3) for gauging the relative importance of the variables $(x_1, x_2, \ldots, x_n)$. As to the direction of co-variance (positive or negative) between x_i and y, the signs of the relevant partial correlations and partial regression weights will be used.

It is worth emphasizing that $(x_1, x_2, \ldots, x_n)$ are not being treated as statistically independent variables, and that the existence and uniqueness of p and of the multiple correlation does *not* require such independence. Such independence appears to be crucial where we want to assign definite substantive interpretations to the regression weights, as is usually the case in econometric models. But even when the independence is achieved the weights are still sensitive to the specific combination of variables in $(x_1, x_2, \ldots, x_n)$, to the units of observation used in their estimation, and to biases in the relevant statistics. There is also the point that regression weights are strictly speaking not comparable if the joint probability distribution of $(x_1, x_2, \ldots, x_n)$ departs markedly from multivariate normality (cf. Bogue and Harris, 1954, p. 16). Thus, it cannot be said that the mere achievement of independence among $(x_1, x_2, \ldots, x_n)$ permits definite substantive interpretations of regression weights. In any event, it is a basic assumption (an untestable first principle) of the writer's approach that the deepest underlying factors of areal variation in migration ratios are correlated. As far as the available evidence goes, the major social and economic dimensions of human communities would appear to be better understood as interdependent rather than mutually independent.

Because of the phenomenon of statistical redundancy, it is assumed that the set of variables $(x_1, x_2, \ldots, x_n)$ tend to form clusters, where the members of each cluster are relatively similar in terms of correlation coefficients. The correlations *within* a cluster are generally higher than those between members of the cluster and variables *outside* the cluster. Also, the variables within a cluster tend to have relatively similar profiles or correlation coefficients with other variables. Since a single factor has only one profile of correlations with a given set of variables, variables having similar profiles of correlation coefficients are likely to manifest a single factor (this is the basic idea behind the technique of finding clusters which has been used for Chapters Seven and Eight, and which is outlined below in Section D.2).

Each cluster may be said to provide a *partial image segment* of y. For simplicity, suppose there are two clusters in $(x_1, x_2, \ldots, x_n)$, where "x_{ij}" is the *jth* variable of the *ith* cluster. Further, suppose that a linear least squares regression is useful (even though better predictions may be available from a non-linear model). Then the partial image segment of the *ith* cluster is

$$p_i = \sum_j a_{ij} x_{ij} \qquad [2].$$

Thus y can be written as

$$\begin{aligned} y &= p_1 + p_2 + f(e_1, e_2) \\ &= \sum_j a_{1j} x_{1j} + \sum_j a_{2j} x_{2j} + f_2(e_1, e_2) \qquad [3], \end{aligned}$$

where $f_2(e_1, e_2)$ is a function of prediction-error terms arising from the two partial image segments. Now if there are m clusters we have m partial image segments, and

$$y = \sum_j a_{1j} x_{1j} + \sum_j a_{2j} x_{2j} + \ldots + \sum_j a_{mj} x_{mj} + f_m(e_1, e_2, \ldots, e_m) \qquad [4].$$

In Chapters Seven and Eight each cluster is represented by one of its constituent variables, usually that which has the maximum sum of intra-cluster correlation coefficients. A more thorough study would have followed the suggestion in equation [4] and used the indicated linear combination of the cluster's members. The practice adopted in Chapters Seven and Eight is acceptable when there is a high degree of multicollinearity within each cluster, which is usually the case (see Appendix Tables A.8, A.9 and A.10).

Within the text the clusters are said to comprise a "group factors", and by this is meant the image segments set forth in equation [4]. Thus, the *ith* group factor is $p_i = \sum_j a_{ij} x_{ij}$, where the weights a_{ij} are obtained from the least squares regression of the y upon the sub-set of variables x_{ij}. Thus [4] provides a kind of group factor analysis of y, where the amount of variance which the analysis explains is measured by the square of the multiple correlation of y with $(p_1, p_2, \ldots, p_m)$. The correlation between two group factors, say the first and second, is simply $r_{p_1 p_2}$. As mentioned above, we have not gone to the trouble of calculating $(p_1, p_2, \ldots, p_m)$ but have simply taken one variable out of each cluster to serve as the group factor index (cf. Sawyer, 1967). This is simply a short-cut procedure, whose basic rationale lies in equation [4]. As mentioned above, the basic reposes in Guttman's theory of image analysis. However, our interpretation of [4] involves ideas from the theory of group factors as set forth in Harmon, 1960, ch. 11, and the chosen rationale for selecting clusters involves ideas from Tryon's cluster analysis (Tryon, 1955), supported by Holzinger's B-coefficient test (Harmon, 1960, pp. 127 - 130).

D.2 IDENTIFICATION OF CLUSTERS

There are many ways of identifying clusters among variables in terms of their inter-correlations (cf. Cattell, 1944; Harmon, 1960, pp. 127 - 130). If we adopt a clear and reasonable criterion of clustering and can use a test to determine whether the criterion is adequately satisfied, it is unnecessary to dwell in detail upon the actual procedure for cluster identification. Various short-cuts in procedure may be employed, as long as a test *(which is independent of procedure)* can be applied at the end to see whether the clusters adequately satisfy the criterion of clustering. The criterion of clustering adopted for this study may be stated as follows.

If it is a fact that a few dimensions (processes) underlie a given battery of variables, we should hope that the variables that fall into a particular cluster are partial manifestations of one of these underlying dimensions. Since such a dimension will have just one profile of correlation coefficients with a selected set of variables, the identification of clusters should be based largely on relative similarity of correlation profiles, among the members of a cluster, in addition to relatively high intra-cluster correlations. A set of m clusters of n variables is said to be the "best available n-grouping of the m variables" when a shift in the group membership of any variable lowers the relative degree of similarity both within the group from which the variable is taken and within that into which the variable is reallocated. Similarity is based on a measure of difference between the correlation profiles of two variables as well as on the zero order coefficient of correlation for the two variables. A group of variables has *relative* similarity when the average degree of similarity within the group exceeds the average degree of similarity between members of the group and variables outside of it.

The actual grouping algorithm used is quite tedious (partly because it involves calculating measures of difference between the correlation profiles of all pairs of n variables), and it will not be set out here. By way of summary, a matrix of scores on the measure of difference in correlation profiles was generated from the correlation matrix. Beginning with the lowest coefficient of profile difference, clusters were formed until the point was reached where the alteration of cluster memberships would lower the average degree of similarity within the groups affected by such alteration (at this point there may be some few variables which failed to fall into any cluster). The set of clusters obtained at this point is the best available set (in the sense indicated above), and such a set always exists and is unique for the particular number of clusters. (The number of clusters we draw is governed by the level of intra-cluster dissimilarity which we are prepared to accept. In this study the choice of a number was guided by the desire to have at least four group factors, a number chosen in the light of the common experience that three or four well-chosen predictors accomplish the vast majority of statistical accounting in a regression analysis.) While satisfied with the criterion of 'best available grouping', we realized that a convenient demonstration that the criterion is satisfied would be difficult to devise. For this reason Holzinger's B-coefficient was calculated for the clusters, recognizing that the B-coefficient is based on the comparison of correlation coefficients rather than upon the correlation profiles of variables (see Cattell, 1944, pp. 173-174, for discussion on this point).

Holzinger's B-coefficient is the ratio of the average within-cluster coefficient or correlation to the average coefficient of correlation between

members of the cluster and variables outside of it. This ratio is expressed as a percentage, and is equal to 100 when the two averages are the same. Thus, some degree of relative similarity within a cluster is indicated when B is greater than 100.

It is difficult to say how much B should exceed 100 before it may be inferred that a significant cluster has been achieved. There is no sampling model that one may invoke to derive a test of significance for B (Harmon, 1960, p. 130) and in any event the data used to create the clusters may not legitimately be used to test the statistical significance of B. (However, if there is another body of data – another correlation matrix for the same variables – we can use a rough approximation to the variance of B and make a rough test of the hypothesis that the pre-existing set of clusters is satisfied by this new body of data.) Harmon, 1960, p. 130, suggests that a B of 130 may be considered close to the minimum for an acceptable cluster. By inspecting the identities of the clustered variables and the numbers in the correlation matrix, one can also make informal judgements as to whether the results of clustering are reasonable.

Of course, the whole exercise of clustering could have been avoided had we resorted to one of the mathematically elegant factor-analytic or principal components solutions with uncorrelated dimensions (described in detail by Harmon, 1960). There are several reasons why this was not done. Among the more decisive are the following. First, we assume that if there are a few factors underlying the areal variation in migration rates these factors are correlated, and the techniques for analysis with correlated factors involve grouping of variables such as that used in Chapters Seven and Eight. Secondly, while we can be sure of the existence and uniqueness of the partial image (defined in Section D.1), we cannot be so sure about the uniqueness of underlying common factors (Guttman, 1953, p. 282). Thirdly, it is useful to minimize one's departure from observed variables in multivariate analysis because this facilitates substantive interpretation and the comparison and accumulation of research findings from different studies. Although a supporter of factor analysis, Cattell clearly admits the importance of this last point:

> It seems to be the contention of those recent researchers which have preferred cluster analysis to factor analysis that while clusters reduce the number of variables practically as effectively as factors, they enjoy greater reality than factors. We shall debate this; but before doing so we shall admit one very real advantage of clusters, namely, that they permit the results of different researchers to be relatively easily combined (Cattell, 1944, p. 181).

In introducing his theory of image analysis Guttman makes the following relevant points: –

> Common-factor theory is still beset with several different kinds of problems of indeterminacy (among them the problems of communalities, of rotation of axes, and of estimation of factor scores) arising from the fact that the [common factors] are hypothetical in the first instance. Many controversies exist as to how to make these variables concrete, and many scientists are sceptical of the validity of the basic premises.
>
> It is interesting that hitherto only the partial-correlation approach — using controversial hypothetical variables — has been used for a structural analysis of a set of variates, despite the fact that the more concrete notions involved in the multiple-correlation approach seem older and more widely accepted (Guttman, 1953, p. 278).

D.3 MEASURING RELATIVE IMPORTANCE OF PREDICTORS

As mentioned in Section D.1, some measure is needed of the relative importance of a set of variables $(x_1, x_2, \ldots, x_n)$ as contributors to the multiple correlation between these variables and another one, y. It was noted that the least squares regression weights for the x-variables would not be suitable because of high multicollinearity among these variables. The measure of relative importance used here is based upon the following type of partitioning of multiple correlation.

Consider the multiple correlation between y and four variables: a, b, c and d. This is represented as "$R_{y.abcd}$". $R^2_{y.abcd}$ is partitioned in a manner similar to the use of partitions in analysis of variance. Each partition is attributed to the influence of a single variable as follows:

$$R^2_{y.abcd} = \left(R^2_{y.abcd} - R^2_{y.abc}\right) + \left(R^2_{y.abc} - R^2_{y.ab}\right) + \left(R^2_{y.ab} - R^2_{y.a}\right) + \left(R^2_{ya}\right)$$
$$= \begin{pmatrix}\text{Contribution}\\ \text{of } d\end{pmatrix} + \begin{pmatrix}\text{Contribution}\\ \text{of } c\end{pmatrix} + \begin{pmatrix}\text{Contribution}\\ \text{of } b\end{pmatrix} + \begin{pmatrix}\text{Contribution}\\ \text{of } a\end{pmatrix} \quad [5].$$

Of course, each of these contributions is positive, so that we can *define* the relative importance of variable i

as $\quad \begin{pmatrix}\text{Contribution}\\ \text{of } i\end{pmatrix} \Big/ \begin{pmatrix}\text{Sum of all}\\ \text{contributions}\end{pmatrix} \quad$ and

this is a proportion.

However, it is obvious that the order in which variables were listed was entirely arbitrary. In this case the contribution of d was assessed from the difference between third order and fourth order multiple correlations, while the contribution of a is assessed from a zero order correlation. Had we assessed the contribution of a from the difference between third order and fourth order multiple correlations, a would have had a different value in importance (see relevant comments on the types of statistical redundancy in Section D.1). To attenuate this difficulty we write as many expressions like [5] as are needed to permit *each* variable to make a contribution at

each order of correlation. With four variables, such as *a, b, c* and *d*, we will need to write 12 equations like [5], in order to accomplish this aim. When this is done in such a way that *each* variable makes the same number (at least one) of contributions at *each* level of correlation, we proceed as follows. Collect and add together all the contributions attributed to a given variable from all 12 equations. Then we define the relative importance of this variable, *a* for example, as:

$$\left(\begin{array}{l}\textit{Sum of all}\\ \textit{contributions}\\ \textit{attributed to a}\end{array}\right) \Big/ \left(\begin{array}{l}\textit{Sum of all contributions}\\ \textit{attributed to all}\\ \textit{variables}\end{array}\right)$$

This number is a proportion (the sum over the relative importance of each variable is 1.0), and it is unique for the particular set of variables. If we alter the set of variables (by addition or subtraction of one or more, or by change of membership without change in the number of variables) we can expect to produce shifts in the measured relative importance of a given variable. This property also applies to regression weights. Indeed it is entirely consistent with the concept of *relative* importance.

In making the relevant calculations it is sufficient to note that $(R_{y.abc} - R_{y.ab})$ is a simple function of the partial correlation between *y* and *c* with *a* and *b* held constant. Thus all the calculations are done with the values of the relevant partial correlation coefficients. It is evident that the writing of equations like [5] and the calculations which follow become tedious when the number of predicting variables exceeds four (although the task may be relieved if a standard computer programme, providing for different numbers of predicting variables, is written and retained for repeated use). On the side of advantages of the procedure outlined here, it may be noted that the measure of relative importance for a given variable is unique regardless of the degree of multicollinearity among the predictors (two perfectly correlated predictors will emerge with equal degrees of relative importance – indicating, quite reasonably, that the statistics fail to discriminate between the two variables). Furthermore, there is no assumption about the probability distributions of the predictors. The key assumption (which will be stated just for the case of third order multiple correlation) is that $(R^2_{y.abcd} - R^2_{y.abc})$ is an adequate measure of the contribution which variable *d* makes to $R^2_{y.abcd}$ after *a, b* and *c* have made their contributions. Techniques based on this idea have been used by Newton and Supurrell, 1967.

In the last column of Tables 7.3, 8.3, 8.7, 8.10 and 8.14, relative importance measures are shown for six variables. Using the procedure described above, these measures were first calculated for the four variables showing the largest zero and third-order partial correlations. For the

remaining two variables it was assumed that their relative importance was highly correlated with their proportional contribution to the sum of the *six* squared partial correlations. An inflation factor based on this proportion was then used in augmenting the *aggregate* contribution to multiple correlation over that originally calculated in the first instance for four variables so as to estimate the aggregates for five and six variables, respectively.

The magnitudes of *augmentation* were then attributed to the additional two variables. This adjustment procedure is, of course, crude; it was adopted only because the shortage of time precluded the preparation of a computer programme which would conduct the analysis described above upon all six variables simultaneously. It should be clearly understood that the extension of the argument given above to six variables is quite straightforward theoretically, and the only problem is the vastly expanded scale of calculations which this extension implies.

Appendix E

INTERPRETATION OF CLUSTERS

E.1 THE PROBLEM OF INTERPRETATION

A rather weak link in the chain of procedures for applying factor analysis is the interpretation of a factor – the inference as to the processes which the factor represents. This inference is based upon an inspection of the identities of the variables which have high and low correlations (factor loadings) with the factor. Unfortunately, the inference is guided by no set of rules which will permit several investigators to reach the same conclusion (as to what a factor represents) from the given set of factor loadings; and, more importantly, it must rely upon certain untestable assumptions which are mentioned below. In short, it seems almost anybody's guess as to what processes a factor represents, particularly when we consider that the investigator is free to choose his factor solution (and hence to arbitrarily influence the values of the factor loadings). Of course, the problem is not peculiar to factor analysis, because any transformation of a set of variables generates index numbers whose meaning will tend to be obscure and subject to varying interpretations.

By relying upon Guttman's theory of image analysis, we minimized the departure from the level of observed variables and thus *partially* attenuated the problem. The partial image of a variable is its projection upon a selected finite set of predicting variables (a projection which always exists and is unique for a specified regression model). This partial image may be said to *comprise* (not reflect) a group factor, so that the group factor is nothing more than the linear combination of the observed variables defined by the least squares regression of the 'dependent' variable upon observed variables. Following this approach, the group factor is manifested *statistically* as a set of numbers, predictions of values 'dependent' variable from combinations of values on the predictor variables – we have thus not taken any significant step away from the level of *observed* variables. The matter could have been left at this point were it not necessary to use the common language of discourse in expositing the results of the multivariate analysis.

In order to make meaningful conversation about the results of the multivariate analysis, it is necessary to offer suggestions as to the pro-

cesses which each cluster of predictor variables (partial image segment see Section D.1) represents. Such suggestions unavoidably involve three untestable assumptions: (1) that there exist in the real world processes (which can cause variations in the 'dependent' variable) reflected by a cluster of variables, and (2) that the identified cluster is a sufficiently valid and reliable indicator of one set (with possibly only one member) of these processes, and (3) that the interpreter correctly identifies some member(s) of this set in interpreting the cluster. As mentioned above, these assumptions plague all interpretations of index numbers, particularly those in factor analysis.

The following Sections indicate the brief interpretations which have been made for the three exercises in cluster analysis done in Chapters Seven and Eight. The foregoing comments should indicate clearly the weakness in these interpretations, and it is worth emphasizing that they have been made mainly to facilitate the exposition of the results of multivariate analysis.

E.2 CLUSTERS IN THE ANALYSIS OF THE 1956-61 IN-MIGRATION RATIO

Table 7.1 lists the variables selected for analysis of the 1956-61 in-migration ratio and shows the clusters into which they are grouped. The following comments indicate the reasons behind the names given to the clusters.

Five variables fall into the first sub-group: (1) the percentage with some university training among males aged five and over and out of school; (2) the female labour force participation rate; (3) the percentage of the female labour force in clerical occupations; (4) the percentage of the male labour force in wholesale trade, finance, real estate and services to business management; and (5) wholesale sales per capita. This group of variables probably reflects the degree of concentration of the occupational structure among the activities requiring higher level professional skills[1] (which tend to a relatively heavy demand for supporting clerical force), as well as the degree of focus of the commercial and service activities in meeting demands arising from other population centres. Thus, this group of variables may be said to comprise a *tertiary industry specialization* factor.

The percentage of population born outside Canada and that which speaks English comprise the second cluster of variables. It is assumed that the centres which attract foreign-born[2] persons tend to be more socially heterogeneous than those which do not, and that the proportion which speaks English tends to be high at most of such centres.[3] The proportion born outside Canada, in particular, is taken as an index of the social hetero-

geneity of a centre's population. These two variables are said to comprise a *'social heterogeneity' factor*.

Three variables comprise the third cluster: (1) the percentage of male earners working at least 40 weeks in the year ending with the census at a rate of 35 or more hours per week; (2) the percentage of male wage earners reporting earnings of at least $4,000 in the year preceding the census; and (3) the percentage with at least $4,000 among males reporting total non-farm income in the year preceding the census. These three variables comprise an *income factor*.

The percentage of the male labour force in professional and technical occupations, the percentage in fabricating industries of the male labour force in manufacturing, and population size comprise the fourth cluster of variables. The bigger urban centres tend to provide the external economies which attract industries carrying relatively large professional forces and engaging in the more advanced stages of manufacturing. These variables may be said to comprise a *modernity of economic structure factor*.

The percentage of the male labour force in manufacturing and value added by manufacturing per capita comprise the fifth cluster. This cluster is a *manufacturing specialization factor*.

Retail sales per capita and service trade receipts per capita comprise the sixth group formed. This group reflects a *trading intensity factor*.

Thus, for the purposes of simplifying the discussion, the 17 variables may be considered to form six group factors: (1) tertiary industry specialization; (2) social heterogeneity; (3) income; (4) modernity of economic structure; (5) manufacturing specialization; and (6) intensity of trading.

E.3 CLUSTERS IN THE ANALYSIS OF THE 1951-61 NET MIGRATION RATIO FOR URBAN COMPLEXES

Table 8.1 lists the variables selected for analysis of the 1951-61 net migration ratio using urban complexes as units, and shows the clusters into which the variables are grouped. The following comments state the reasons behind the names given to the clusters.

Six variables may be said to comprise a *metropolitan status* factor: (1) 1951 wholesale sales per capita; (2) 1951 service trade receipts per capita; (3) 1951 proportion of the female labour force in clerical occupations; (4) 1951 proportion of population born outside Canada; (5) 1951 proportion earning at least $3,000 (in the year preceding the census) among male wage earners; and (6) 1951 infant mortality rate. The metropolitan complex would be expected to show high values (relative to other centres) on the first five variables, and a low value on the infant mortality rate. Its

performance of economic functions for other urban centres should be reflected partly in the wholesale trade measure.[4] The metropolitan complex would also tend to have relatively high levels of living (as reflected in the higher than average earnings and lower than average infant mortality rates), and relatively high concentrations of population born outside Canada.

Four variables comprise the second group: (1) 1951 percentage of the male labour force in professional and technical occupations; (2) 1951 percentage of the male labour force in public administration; (3) 1951 percentage with 13 or more years of schooling among males at least five years old and out of school; and (4) 1951 female labour force participation rate. These variables reflect the degree of concentration of the working force at the higher levels of occupational skills, which tend to require the higher levels of education. Associated with concentration in the professional occupations is a relatively high demand for a supporting clerical work force, which in turn tends to raise the level of female labour force participation. The four variables mentioned above may be said to comprise a *working force skill structure factor*.

The third group of variables may be said to comprise an *accessibility* factor. It consists of: (1) the percentage 1941 - 51 change in the share of the male labour force in professional and technical occupations; (2) 1951 population size; and (3) distance to the nearest Census Metropolitan Area. The grouping of the second and third variables is expected, since the largest centres are MAs and many of the other centres above 30,000 in size are clustered near MAs. In a period of very rapid modernization (1941 - 51) it is plausible that the growth ratio of professional occupations was fastest in the larger urban complexes which attracted the industries in the vanguard of technological change. Generally, centres with high values on these variables (interpreting the low distance in terms of high proximity) are the more accessible ones from various points in Canada.

Three variables were sufficiently peculiar in their correlation profiles that they failed to group together or to be allocated with any pre-existing group. These are the 1951 per cent of the male labour force in manufacturing, the 1941 - 51 population growth rate, and the relative change (1941 - 51) in the proportion of male wage earners who worked 50 or more weeks in the year preceding the census. For convenience it may be considered that these three variables respectively reflect the degree of specialization in manufacturing, demographic growth and growth in employment opportunity.

Thus, for the purpose of simplifying the discussion, the 16 variables may be considered to form six correlated group factors: (1) metropolitan status; (2) working force skill structure; (3) accessibility; (4) manufacturing specialization; (5) demographic growth; and (6) employment opportunity

growth. This is the best available 'six-grouping' of the 16 variables in the sense indicated in Appendix D, Section D.2. Holzinger's B-coefficient test (described in Section D.2) also indicates that the grouping is effective.

E.4 CLUSTERS IN THE ANALYSIS OF THE 1951-61 NET MIGRATION RATIO FOR COUNTIES OR CENSUS DIVISIONS

Table 8.8 lists the variables selected for analysis of the 1951-61 net migration ratio using counties or census divisions as units, and shows the clusters into which the variables are grouped. The following comments state the reasons behind the names given to the clusters.

Eight variables fall into the first group, and these may be said to comprise an *urbanization factor*. The variables show relatively high positive inter-correlations, and they are just the variables which can be expected to show such a pattern of association with the level of urban development in a region. They are: (1) the percentage of population in urban centres in 1951; (2) the 1951 percentage with at least 13 years of schooling among males out of school and aged five and over; (3) the 1951 female labour force participation rate; (4) the 1951 percentage of the female labour force in clerical occupations; (5) the percentage of male wage earners earning at least $3,000 in the year preceding the 1951 Census; (6) the 1941-51 change in the percentage of the male labour force in professional and technical occupations; (7) the 1941-51 change in the percentage of male wage earners working at least 50 weeks in the year preceding the census; and (8) distance from the county's largest city to the nearest Census Metropolitan Area.

The second group of variables includes the 1931-41 natural increase ratio, the 1951 infant mortality rate and the 1951 per cent of population born outside Canada. It is assumed that in the 1931-41 decade natural increase ratios tended to vary inversely with social and economic status (for a population), and that the infant mortality rate varies inversely with the level of living in a Canadian community. The correlation between the 1931-41 natural increase ratio and the 1951 infant mortality rate is positive and high (0.60) for 119 units of observation, and both variables show a marked negative correlation with per cent of the 1951 population born outside Canada. It was argued (see Chapter Seven, footnote [10]) that the per cent of a centre's population born outside Canada should be positively correlated with that centre's share of employment opportunity. All three of the above-mentioned variables show marked degrees of correlation (in the expected directions) with per cent of male wage earners who earned $3,000 or more in the year preceding the 1951 Census. In the light of these considerations the three variables may be said to comprise a *level of living factor*.

The third group of variables may be said to comprise an *intensity of trading factor.* The variables in question are: (1) total sales per capita in 1951; (2) service trade receipts per capita in 1951; and (3) 1951 population size. These three variables show relatively high and positive intercorrelations.

The fourth group consists of two variables which have a marked negative correlation (−0.51). They are the 1951 per cent of the male labour force in manufacturing and the 1951 per cent of this labour force in trade, finance, insurance and real estate. This group is said to comprise a *manufacturing specialization factor.*

Two variables failed to form a group or to fall into any pre-existing group. They are: (1) the 1951 per cent of the male labour force in professional and technical occupations; and (2) the 1941-51 population growth rate.

FOOTNOTES TO APPENDIX E

[1] It should be noted that there is a high correlation between the schooling variable in this group and the percentage of the male labour force in professional and technical occupations, which falls into another group. This may appear to be an anomaly of the grouping algorithm (see Appendix D, Section D.2, for related information, however).

[2] By "socially heterogeneous" is meant that a wide variety of cultural backgrounds, ethnic origins, religions, educational levels and occupations is present *and* that the distribution of population is not overwhelmingly concentrated in any confined segment of the cross-classification of these attributes.

[3] Of course, the proportion speaking English is also high at centres occupied overwhelmingly by persons of British Isles origin but such ethnic diversity does tend to be reflected by a high proportion which speaks in English (that is, either English only or at least bilingual).

[4] A strong tendency for metropolitan areas to show relatively high concentrations of the work force in wholesale trade and in services to business management has been noted in other studies (Duncan, *et al.*, 1960, ch. 11; Fox and Kumar, 1965, and Stone, 1967, ch. 9, Section 9.7). Also, central place analysts seem to consider relative specialization in wholesale trade as a partial indicator of a high rank in the central place hierarchy (cf. Fox and Kumar, 1965).

Appendix F

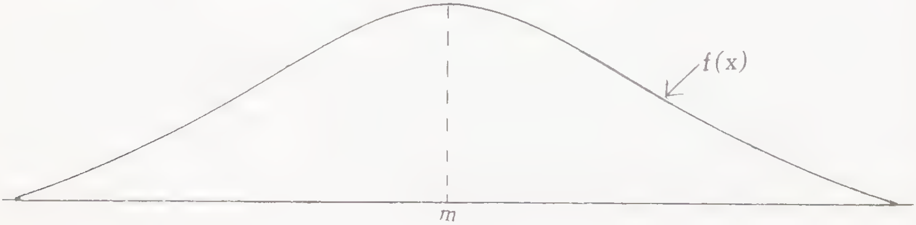
STATISTICAL INFERENCE AND INTERPRETATION FOR THE MULTIPLE CORRELATION COEFFICIENT

F.1 STATISTICAL INFERENCE

At a few points in the text, statements have been made about the statistical significance of a multiple correlation coefficient (see Sections 7.3, 8.4 and 8.6) or of a measure of mean deviation between two sets of correlation coefficients. The following comments outline the rationale for such statements, largely omitting the detailed mathematical argument.

Typically, practical statistical inference assumes independent observations and a form of the probability distribution of the relevant statistic which is so definite that it can be stated mathematically. Here, we shall allow for dependent observations and make fairly weak assumptions about the distribution of the relevant statistic. The vast majority of statistics are found to have frequencies which are very low in their extreme values, and which decrease as one goes toward more and more extreme values. This statement is assumed to apply to the two statistics mentioned in the preceding paragraph. Using this assumption, a somewhat refined Tchebycheff-type inequality is derived as the basis for statistical inference. The inequality is, of course, relatively crude (at least in comparison with the results one can get by assuming independent observations and a definite distribution for the relevant statistic) but it is sufficient for the purposes of this monograph.

Assume that the frequency function of a statistic x, $f(x)$, is such that at some distance away from the mean, m, the frequency function declines at a decreasing rate as x increases. More formally, for $m + 2\sigma_X \leq x$, $|df(x)/dx|$ approaches zero with strict monotonicity. A typical picture of such a frequency is



From the foregoing assumptions it can be shown that

$$\int_{m+k\sigma_x}^{u} f(x)\,dx \leq \tfrac{1}{2} f(m + k\sigma_x)\,[u - (m + k\sigma_x)] \qquad [1],$$

where $|x| \leq u$

$2 \leq k$

σ_x is the standard deviation of x.

We shall now try to find an upper bound for $f(m + k\sigma_x)$. From the Tchebycheff inequality it is known that

$$\int_{m+k\sigma_x}^{u} f(x)\,dx \leq p/k^2 \qquad [2],$$

where p is

$$p = \int_{m+k\sigma_x}^{u} f(x)\,dx \Bigg/ \left[\int_{m+k\sigma_x}^{u} f(x)\,dx + \int_{m-k\sigma_x}^{-u} f(x)\,dx\right]$$

Interpreting $|u|$ as the maximum possible numerical value of x, the intervals $-u \leq x \leq m - k\sigma_x$ and $m + k\sigma_x \leq x \leq u$ are the domains of 'tails' of the distribution and p gives the proportion of both tails located in the upper half.

Now p/k^2 is the area of a rectangle whose base is $[u - (m + k\sigma_x)]$ and whose height is $p/k^2\,[u - (m + k\sigma_x)]$. The actual value of the left-hand side of [2] is usually very much smaller than this rectangle. In fact if the distribution is only moderately skewed (if skewed at all) this value is likely to be less than $4p/9k^2$ by Gauss' theorem (Cramer, 1946, pp. 231). Following the same argument (not published here) used to establish [1],

$$f(m_o + k\sigma_x) \leq p/k^2\,[u - (m_o + k\sigma_x)] \qquad [3].$$

Substituting [3] into [1], and letting $k = 3$, we find that

$$Pr\left\{|x - m| > 3\sigma_x\right\} = \int_{m+3\sigma_x}^{u} f(x)\,dx + \int_{m-3\sigma_x}^{-u} f(x)\,dx \leq 0.056 \qquad [4],$$

where "$Pr\,(x > y)$" means the probability that x is greater than y.

Inequality [4] may be further refined, in the light of the assumption that $x \leq u$. Let $u = h\sigma_x$, so that $h > k$.

Then we may derive the following refinement of [4]:

$$Pr\left\{|x - m| > k\sigma_x\right\} \leq 1/2 \left(\frac{1}{k^2} - \frac{1}{h^2}\right) \qquad [4a].$$

Let R refer to the calculated multiple correlation coefficient, and write $R = k_R . \sigma_R$.

Under the null hypothesis that the true value of R is zero, we have

$$Pr\left\{R > k_R \cdot \sigma_R\right\} \leq 1/2 \left[\frac{1}{k_R^2} - \frac{1}{h^2}\right] \qquad [4b],$$

where

$\sigma_R = 1/\sqrt{n-m}$

n = number of observations

m = number of 'independent' variables

$h = u/\sigma_R \doteq \sqrt{n-m}$

$k_R = R/\sigma_R \doteq R\sqrt{n-m}.$

Hence

$$Pr\left\{R > k_R \cdot \sigma_R\right\} \leq \frac{1}{2(n-m)R^2} - \frac{1}{2(n-m)} \qquad [5].$$

This formula gives an upper bound for the probability that R would exceed its hypothesized true value of zero by a margin greater than the value of R itself – roughly the probability of observing an R as high as that calculated.

Inequality [5] may also be applied to the zero order correlation coefficient by setting m o, assuming one is testing the hypothesis that the true coefficient is zero.

A notable difficulty of the foregoing results arises from the fact that σ_R is approximated from a formula whose validity is at present known just for the case where the sample observations are independent and obtained from a multivariate normal distribution. It is not known how much adjustment is needed for this approximation, which is all that is presently available as a basis for assessing σ_R.

F.2 INTERPRETATION

Let "$\hat{y}_i$" be the value predicted for the variable y in the *ith* area by some multiple regression equation. Let "y_i" be the actual value of this variable in the *ith* area, and "$\bar{y}$" be the mean value of y over all areas. Let "n" be the number of areas. The variance of y_i can be written as

$$\frac{1}{n}\sum_i^n \left(y_i - \bar{y}\right)^2 = \frac{1}{n}\sum_i^n \left(\hat{y}_i - \bar{y}\right)^2 + \frac{1}{n}\sum_i^n \left(y_i - \hat{y}_i\right)^2 \qquad [1]$$

(see Guilford, 1956, p. 379). The first term on the right-hand side of [1] defines the *variance predicted* from the set of $\left\{\hat{y}_i\right\}$, $i = 1, 2, \ldots, n$. The

second term on the right-hand side of [1] defines the squared standard error of the *predicted level of* y_i.

By definition, the square of the multiple correlation coefficient is

$$r^2_{y_i \hat{y}_i} = 1 - \left[\sum_i^n \left(y_i - \hat{y}_i \right)^2 \right] \Big/ \left[\sum_i^n \left(y_i - \bar{y} \right)^2 \right] \qquad [2]$$

(see Guilford, 1956, p. 377). It is evident from [1] that

$$r^2 = \left[\sum_i^n \left(\hat{y}_i - \bar{y} \right)^2 \right] \Big/ \left[\sum_i^n \left(y_i - \bar{y} \right)^2 \right] \qquad [2a],$$

so that r^2 is the proportion of the *actual variance* in y_i which is comprised by *predicted variance*. All of this is well known, and it is recounted here to make clear, as [2a] shows, that the square of the correlation coefficient does *not* provide a measure of the degree of accuracy with which the value of the variable y for the *a specific area,* the *ith* area, is predicted by the value $\hat{y}_i$. Thus we still need a measure of the *degree of accuracy of prediction* of y_i from $\hat{y}_i$. Such a measure would gauge the extent to which y_i, the value of y *for a specific area,* is accounted for *statistically* by the predicted value $\hat{y}_i$.

To define a measure of accuracy of prediction, we make use of the following identity:

$$y_i = \hat{y}_i + \left(y_i - \hat{y}_i \right) \qquad [3].$$

Actual value = Predicted value + Error of prediction.
The relative contribution of the predicted value *vis-a-vis* the error of prediction can thus be defined as

$$v_i = |\hat{y}_i| \Big/ \left[|\hat{y}_i| + |y_i - \hat{y}_i| \right] \qquad [4],$$

where "$|x|$" means the absolute value of x. Clearly $o \leq v_i \leq 1$.
Moreover,

$$1 - v_i = |y_i - \hat{y}_i| \Big/ \left[|\hat{y}_i| + |y_i - \hat{y}_i| \right] \qquad [4a],$$

which is the relative importance of the error of prediction. Thus we can say that $100v_i$ gauges the *percentage of accuracy with which* y_i *may be predicted from* $\hat{y}_i$.

Now we may *define* an average percentage of accuracy in prediction of y_i from $\hat{y}_i$ as

$$\frac{v = 100 \sum_i^n |\hat{y}_i|}{\sum_i^n \left[|y_i| + |y_i - \hat{y}_i| \right]} \qquad [5].$$

which will be called the "coefficient of prediction accuracy".

Thus, in summary, the squared multiple correlation and the coefficient of prediction accuracy are taken as measures of two different, though related, aspects of the goodness of fit of the regression estimates y_i. The latter coefficient is a measure of the average degree of accuracy with which individual values of y_i may be predicted from the regression equation, while the squared multiple correlation measures the degree of accuracy with which the *variance of* y_i *over all areas* is predicted from the *variance of the regression estimates.*

Appendix G

ESTIMATING JOINT DISTRIBUTIONS IN A FIVE-WAY CROSS-CLASSIFICATION FROM THE RESULTS OF LESS DETAILED CROSS-CLASSIFICATIONS

The joint distributions shown in Tables 7.4, 8.4 and 8.11 are usually estimated from cross-tabulation of the number of observations. In these tables there are too few observations to provide reliable estimates of the distributions in this five-way cross-tabulation. Therefore approximations were used based on the results of less detailed cross-tabulations. The basic formulas for approximation are as follows.

Each number in the tables has the structure of a conditional probability, where the condition is comprised of the values on four different variables. A general formulation would be 'the conditional probability of the *ith* value of variable m, *given* specified values on variables a, b, c and d':

$Pr\,(m_i \mid a, b, c, d)$.

By definition, this conditional probability is equal to

$$Pr(m_i \mid a, b, c, d) = Pr(m_i \mid a, b, c) \,.\, Pr(d) \mid m_i\ a, b, c)/Pr(d) \mid a, b, c, \qquad [1].$$

Consider the following approximation:

$$Pr(d \mid a,\ b,\ c,\ m_i) \cong Pr\,(d \mid a,\ m_i) \qquad [2].$$

If we use this approximation, we in effect ignore the influence of the interaction of (a, m) with (b, c) upon the conditional probability of d. This generates an *error of approximation*, and the crucial assumption in the estimation formula adopted involves the manner in which this error is distributed. This will be shown shortly.

From the approximation equation [2] and the basic definitions in probability calculus we get

$$\text{Approx.}\quad Pr(m_i \mid a, b, c, d) = Pr(m_i \mid a, b, c) \,.\, Pr(m_i \mid d,\ a)/Pr(m_i \mid a) \qquad [3].$$

The estimation formula is then defined as

$$Est.\ Pr(m_i \mid a, b, c, d) = \frac{Pr(m_i \mid a, b, c) \,.\, Pr(m_i \mid d, a)}{Pr(m_i \mid a) \sum\limits_{i} \text{Approx. } Pr(m_i \mid a, b, c, d)} \qquad [4].$$

Due to the error of approximation each of the N values of Approxi., $Pr(m_i \mid a, b, c, d)$ $(i = 1, 2, .., N)$ requires some correction. The "total amount of correction" is defined as

$$| 1 - \sum_i \text{Approx. } Pr(m_i \mid a, b, c, d) |.$$

The basic assumption of the estimation formula is that the percentage share for a given value of Approx. $Pr(m_i \mid a, b, c, d)$ in the total amount of correction is roughly the same as its share in $\sum_i$ Approx. $Pr(m_i \mid a, b, c, d)$. A similar type of assumption is made in regression analysis, where it is assumed that the errors of estimation are uncorrelated with any of the independent variables.

Equation [4] is the basic formula used to obtain the numbers in Tables 7.4 and 8.11. The elements of the formula (see equation [3]) are calculated from direct cross-tabulations of the sample of observations.

In the case of Table 8.4, there were too few observations to permit estimation of $Pr(m_i \; a, b, c)$ from direct cross-tabulations. The following modification of equation [4] was used for this table:

$$Est.\ Pr(m_i \mid a, b, c, d) = \frac{Pr(m_i \mid a, b) . Pr(m_i \mid a, c) . Pr(m_i \mid d, c)}{Pr\ (m_i \mid a) . Pr\ (m_i \mid c)} \qquad [5].$$

Appendix H

TOWARD SYSTEMATIC EXPLANATION OF AREAL MIGRATION RATES IN TERMS OF MIGRATION PROBABILITIES FOR INDIVIDUALS

The support for hypotheses concerning the explanation of areal variation in net migration ratios should be both theoretical and empirical, and it is appropriate to sketch here some aspects of the relevant framework of theoretical considerations. Ideally, this framework takes the form of an explanatory model of migration in which one derives testable hypotheses from general theoretical premises. No attempt will be made here to offer such a neat package of propositions from which are derived testable hypotheses, because the number of migrants entering or leaving an area is a sum of the results of several different processes, each of which may require its own causal interpretation. For example, it is assumed that the causal mechanism which may account for life-cycle in-migration (see Section 7.3.1) is different from that which may account for in-migration in search of a better job. But the total number of in-migrants is a quantity which adds together the results of both causal mechanisms, as well as of the others which contribute to this total.

The total number of migrants entering an area is a sum over the number of migration streams for which this area is the destination. Similarly, the total number of out-migrants is a sum over the number of streams for which the area is the origin. Each stream is an aggregate result of individual decisions to migrate from a specific origin to a chosen destination. Each individual decision is triggered by a complex of factors which include characteristics of (a) the individual (for example, a recent change in life-cycle stage), (b) the area of origin, and (c) the alternative destinations. The relevant characteristics of the areas of origin and destination are varied. They are economic[1] (e.g., areal differences in unemployment rates, in job opportunities for certain occupations, in wage rates, etc.), geographic (e.g., climate; accessibility to major sources of goods, services and recreation; availability of adequate residential space and facilities), demographic (e.g., congestion of population, population size in relation to the sources of income, population composition regarding demographic attributes such as sex, age and marital status), and social (e.g., the composition of population along major dimensions of social status such as education, ethnic origin,

occupation, 'style of life';[2] the presence of relatives, friends, or of others with significant social attributes; and the amount of information received about relevant conditions at the alternative destinations as well as at the place of origin). The relative importance (weight) of a given factor varies among individuals, and the factor is distributed unevenly among the areas.[3]

Suppose the relevant factors are listed and we identify a certain number, m, of them. Let "f_i" mean the *ith* of the m factors, and "w_{ij}" be the relative importance (weight) of the *ith* factor to the *jth* individual. The collection of weights for this individual $(w_{ij}, w_{2j}, \ldots, w_{mj})$ may be called his "preference structure". Now certain preference structures may be considered similar, so that all the individuals having these preference structures may be grouped together. In this way the population of individuals at each location may be subdivided into groups, where the persons within a group have similar preference structures.

Since a preference structure involves characteristics of the areas of origin and destination, and since the characteristics are distributed unevenly among the areas, the areas will have unequal degrees of attractiveness to a particular individual. It is assumed that persons with similar preference structures will find roughly similar degrees of attractiveness in a given area. Thus, for each group of similar preference structures and area of origin we may posit a probability distribution which governs the allocation among the possible destinations of persons with such preference structures. Thus, the total number of migrants entering (or leaving, as the case may be) an area, is a function of $n.k$ probability distributions for the n identified groups of similar preference structures and k areas, and of the distribution of population among the n preference structure groups and k areas.

Now suppose a particular factor or combination of a few factors may be considered to be dominant in a group of similar preference structures. This consideration may be based on the observation that the particular combination of factors has an unusually large combined weight in the preference structure. Then we may say that the combination of factors is dominant in generating a particular probability distribution of migrants over the areas. Thus we may say that each dominant combination of factors 'allocates' migrants over areas in a particular way indicated by a specific probability distribution of migrants over areas. The actual total number of migrants received by one area is a function of several probability distributions, each distribution corresponding to a particular dominant combination of factors.[4] Each such combination of factors may represent a particular causal process influencing inter-area migration.

From the foregoing stipulations we can derive the formulas for the probabilities of in-migrating to and of out-migrating from a given area. These formulas make explicit allowance for the radically different causal processes (which are represented in the different preference structure groups) which contribute to the total number of migrants. With these probabilities we can define the expected value of net migration for the area in question. To obtain this expected value, it is necessary to estimate the sizes of (a) the population of potential in-migrants to the area and (b) the population of potential out-migrants from the area. The product of quantity (a) and the in-migration probability *minus* the product of quantity (b) and the out-migration probability is the expected net migration for the area in question.

The foregoing discussion suggests certain properties for a fully adequate statistical explanation of the areal variation in the net migration ratio. First, the 'independent' variables should include one or more which reflect the areal variation in the ratio of potential in-migrants to potential out-migrants. Secondly, since different causal processes contribute to the total number of migrants and they may vary in relative importance from one body of data (representing specific regions and time periods) to another, the list of variables which would fully account for the areal variation in net migration can be quite diverse in terms of covering a number of economic and non-economic factors.

Treating the relative sizes of the populations of potential in-migrants and out-migrants as given data, the analysis of the net migration focuses on the in-migration and out-migration probabilities. The values of these probabilities for a given area may be said to depend on the area's force of attraction (cf. Gossman *et al.*, 1967, pp. 46-53). The area's force of attraction depends upon its economic, geographic, demographic and social attributes. In Chapter Eight the variables chosen to reflect these attributes are among those suggested by the findings and discussion in previous migration research.

The basic and quite simple mathematical formulas emerging from the foregoing stipulations may be exposited as follows:

Let the relevant geographical territory be partitioned into K regions: $(A_1, A_2, \ldots, A_k)$.

Let "w_{ij}" mean the relative importance (measured as a weight) of the *ith* factor in influencing the migration decision of the *jth* individual. Thus, for m factors we can define this individual's "preference structure" as $(w_{ij}, w_{2j}, \ldots, W_{mj})$. Thus we can define an m-dimensional preference structure space, where each individual can be located as a 'point' in this space. Similar points (individuals) may be classified together to form a

'preference structure group', so that the entire preference structure space may be partitioned into n preference structure groups.

Let "o" and "i" represent two successive points in time, and "e" represent areas outside of i.

Let "N_i" represent the population of potential out-migrants from area i, and let "N_e" represent the population of potential in-migrants to area i.

Finally, let "$Pr(X)$" mean the probability that X is true, and "$Pr(X|Y)$" mean the probability that X is true if Y is true, and "$Pr(X,Y)$" mean the probability that both X and Y are true.

The expected net migration for area i is represented by "EM", and

$$EM = N_{eo}.Pr\ (A_{i1}, A_{eo}) - N_{io}.Pr\ (A_{e1}, A_{io}) \qquad [1]$$

where

$$Pr\ (A_{i1},\ A_{eo}) = \sum_{j,\, i \ddagger j} Pr(A_i, \ | \ G_{jo}, A_{eo}).\ Pr(G_{jo}, A_{eo}) \qquad [2],$$

and $$Pr(A_{e1}, A_{io}) = \sum_{j} Pr(A_{e1} | G_{jo}, A_{io})\ .\ Pr(G_{jo}, A_{io}) \qquad [3].$$

The key elements in these expressions are the migration probabilities in [2] and [3]. $Pr(A_i \mid G_{jo}, A_{eo})$ is the conditional probability of in-migrating to area A_e, for those who have preference structure G_j in area A_e. $Pr(A_{ei} | G_{jo}, A_{io})$ is the conditional probability of out-migrating from area A_i for those with preference structure G_j in area A_i.

It should be noted that a wide variety of variables which would seem to affect individual migration probabilities may be included in the preference structure space. The only restriction (in principle) placed on the definition of this space is that it contain a finite set of m partitionable variables, so that G_j is an m-dimensional region in this space. Variables such as sex, age, duration of residence, occupation and income may be included in the definition of the preference structure space. An application of this idea may be found in the migration model set forth by McGinnis, Myers and Pilger (1963), which includes duration of residence. Thus the foregoing stipulations constitute a radical extension of the basic innovation in the Cornell Model (cf. McGinnis, 1966). Under certain conditions set forth by the author (Stone, 1968) in a paper on the Cornell Model, the in-migration and out-migration probabilities represented in [2] and [3] will converge to and attain constant values if the conditional probability terms in these expressions are independent of time.

We may also define a ratio of expected net migration which would seem to facilitate work with equation [1]. We may define

$$EMr = EM/N_{io} = \left(\frac{N_{eo}}{N_{io}}\right) Pr(A_{il}, A_{eo}) - Pr(A_{el}, A_{io}) \qquad [4].$$

The formulation in [4] makes it unnecessary to estimate the actual sizes of the populations of potential in-migrants and out-migrants. We can now concentrate on appoximating the *ratio* of these two populations.

FOOTNOTES TO APPENDIX H

[1] The classification of variables into such categories as economic, social, geographic, etc., is clearly arbitrary. Many variables would overlap such categories. However, the classification is stated with the aim of simplifying the discussion.

[2] It should be recalled that the potential migrants' *perception* of areal characteristics is an important intervening variable; probably associated with areal flows of information.

[3] By "uneven distribution" is meant that the areas have varying 'amounts' of a given factor.

[4] Summary statements suggesting the basic ideas expressed here are in the work of Lee, 1966 and of Beshsers, 1967.

Appendix I

SPECIFICATION OF A REGRESSION MODEL FOR THE ANALYSIS OF INTER-PROVINCIAL MIGRATION

by

R. Marvin McInnis

I.1 INTRODUCTION

The general features of an economic theory of migration drawn from the theory of resource allocation is outlined in Chapter Five. The purpose of this Appendix is to go in greater detail into some of the issues involved in moving from a general theoretical formulation to a specific model that can be estimated by regression analysis. The choice of relationship to represent the theory that has been outlined is a reasonably open one. There is, however, a growing literature of empirical research on migration from which one can draw suggestions as to specifications. There is, unfortunately, no concise review of this literature readily available and space does not permit such a review here. Several contributions along two possible lines of approach are reviewed by Lowry, 1966, but he overlooks some of the work that is of the greatest relevance for the present study. The literature indicates little in the way of consensus, though. This is partly due to differences in the theoretical viewpoints of the various researchers but also stems from the rather ambiguous nature of the explanatory variables that are commonly adopted.

Previous research in the field of migration suggests several classes of operational models. First there are models of the gravity type which are not developed from specifically economic assumptions about human behaviour. These models have a theoretical foundation that is based on a view of social aggregates rather than individual behaviour. Among the more sophisticated models of this class are those of Somermeijer, 1961, and Lowry, 1966. Of the models which are more specifically economic, one may distinguish between those which emphasize what are essentially structural factors – usually designated "job-opportunities". The former class of models relate migration to wage or income differentials, as is done in the earlier work of Sjaastad, 1960. The "job-opportunity" type of models are probably

the most common. In application they typically relate migration to unemployment variables. The classical work of Makower, Marshak and Robinson, 1939, is in this vein. A somewhat different approach to the "job-opportunity" model, but still essentially in the same category, has recently been taken by Cicely Blanco, 1964.

The model that is explored in this study was developed directly from the economic theory of resource allocation, largely independently from most of the literature. The specification that is used, however, is similar in a number of ways to earlier studies that have been made. The model falls closest in line to those which have been developed out of the common assumptions of individual behaviour market. It should be noted, though, that models of that sort are almost surprisingly rare. The work carried out here is mostly in the spirit of that of Nelson, 1957 and 1959, and Sjaastad, 1960, and has considerable affinity with a recent study by Gallaway, 1967, the report of which was seen after work on the present study was completed.

One thing that emerges from a consideration of the existing literature on internal migration is that there are many important issues in the specification of regression models for the analysis of migration that merit exploration. But this is not the place. The purpose of the present study is to undertake a preliminary exploration of inter-provincial migration in Canada using a relatively simple economic model. The consideration in detail of issues of specification must be reserved for a later study. Some choices will have to be made, however, to undertake any research along the lines that have already been sketched out. It is important, though, to sound a note of caution, to make clear that what is done here is very much in the way of a preliminary analysis and will undoubtedly be improved upon in the future.

The intent of the specification developed here is to emphasize especially the two particularly economic elements in individual decisions to migrate – monetary gains from movement and the costs that must be incurred. The approach stresses income differentials more than unemployment or other indicators of labour market disequilibrium. Although results are reported that are used to assess the theoretical formulation and to support a preference for one form of model over others, any really general conclusions about the merits of one specification relative to others must await research that is directed to that particular problem and is designed to discriminate critically between alternative models.

The following discussion of the specification of the regression model used in this study considers two issues. There is first the question of what is to be explained – the choice of a dependent variable. Secondly, the determinants of the migration variable that are indicated by the theory must be

stated in an explicit and operational way and the relationship given a form that is amenable to estimation by regression techniques.

1.2 THE DEPENDENT VARIABLE

While we clearly wish to examine some form of inter-provincial migration of population, care must be given to the selection of a particular measure. With only ten provinces in Canada, it is necessary to use something other than just provincial net migration if the regression approach is adopted. The 1961 Census classification of the migrant population by province of residence provides us with a matrix of flows of population between pairs of provinces. A variable M_{ij}, the flow of migrants from the *ith* to the *jth* province, is ultimately what we should like to explain. It has been used as the dependent variable in much of the recent economic analysis of migration in the United States. But there is a severe problem in attempting to explain M_{ij} when using aggregate rather than micro data. In the matrix of inter-provincial migration there is for every M_{ij} an M_{ji}. To the extent that an economic model adequately predicts M_{ij} it will fail to account for M_{ji}. It would seem hardly reasonable to pursue an approach that would show the economic theory of migration to be wrong 50 per cent of the time. The difficulty need not arise if one were able to use micro data with the appropriate explanatory variables for each individual migrant.[1] What is available at present, however, is information only for an aggregate group of migrants and explanatory variables that pertain to all persons (not even all migrants) in each province. This situation strongly points to the use of net difference between in-migration and out-migration for the dependent variable. The present study goes about as far as the available data permit in disaggregating inter-provincial flows of migration, but the categories of migrants that are recognized are still too aggregative to make the model readily applicable to particular streams of gross migration. Therefore, the dependent variable that will be used throughout this study is the net interchange between each pair of regions. This variable is designated N_{ij}.

The dependent variable is used alternately in the form of the absolute size of the net interchange (N_{ij}) and as a rate per thousand persons in the same specified class of the population in both provinces involved in the interchange (N_{ij}).[2] It is common in the analysis of migration to use a rate as the dependent variable on the grounds that migration ought to be positively correlated with population size. The basis for such an expectation is far from clear, but even granting it, there is no reason to expect a relationship of direct proportionality and it seems useful not to go too far in pre-specifying the relationship without any strong theoretical basis, but rather to introduce the relevant population base as an independent variable.

The original conception of the analysis undertaken here was to use the 45 pairs of net provincial interchanges. This would have constituted a reasonably satisfactory number of observations. The uneven sizes of Canadian provinces prohibited this. Given the extent of error (both random and systematic) in the migration statistics, the numbers of migrants in some of the inter-provincial streams are clearly too small. It was necessary to combine the Atlantic Provinces into one region, thus reducing the number of observations to only 21. The Prairie Provinces partly compensate for small population size. While it might be possible to utilize 10 individual provinces and 45 net interchanges for the analysis for all male migrants, much of the contribution attempted in this study lies in the analysis of the migration of specific sub-groups of the population. Consequently, the same format, utilizing 21 observations, is adopted throughout. This small sample must be regarded as barely minimal for multivariate regression analysis. Certainly, it constrains the degree of complexity that can be attempted and generally minimizes the power of the analysis.

The foregoing discussion raises one very important point brought out by this study. While the 1961 Census sample data on migration are the best we have yet had in Canada for the analysis of population movements, it turns out that they are scarcely adequate for the purpose. They provide a number of observations that is so small as hardly to meet the minimum requirement of a viable regression analysis. This is especially so when we realize that the geographical order into which these data are locked must violate the assumption that they are truly independent observations. Such a small number of observations weakens the tests of significance that we would like to apply and distinctly limits the number of explanatory variables that can appropriately be used. Most seriously, the level of detail at which the analysis can be carried out is sharply curtailed. The hard fact is that the population of Canada, and especially of some of its regions, is so small that even so large a sample as that taken in the 1961 Census, when applied to a characteristic such as inter-provincial migration that encompasses only a fraction of the population, does not permit a cross-classification by more than two or three other characteristics before the inter-provincial streams become so small that they may be wholly dominated by sampling error and errors of enumeration. Most of the detail that one would like to consider and which, in the abstract, is available from the 1961 Census is not in fact usable. When any really interesting level of detail is approached, as many as half the cells in an inter-provincial migration matrix may contain entries of fewer than five persons. Because of this, it is not possible to analyse migration by even broad occupation groups. An attempt is made in Section 5.7.9 to consider migration by education classes and two broad age categories. Even this cannot be carried out effectively since

nowhere near enough usable observations can be obtained for males with college education – an especially interesting group. Thus, the limitations upon the analysis of inter-provincial migration that are imposed by the available statistics are indeed severe.

What is really distressing is that these severe limitations upon the analysis of migration could not be surmounted by sampling a larger proportion of enumerated households or by providing for more elaborate tabulations. A large proportion of the statistics tabulated from the 1961 Census migration question turns out to be unusable for the kind of analysis attempted in this study. Yet it is important that we obtain reliable general explanations of population migration. Real progress lies in samples which obtain micro data. Direct sampling would provide not only a body of information on migration but also the relevant explanatory data for individual households. Such an approach would overcome most of the difficulties that are inherent in the use of census data. In particular, a sample survey would give access to information about the various changes in income and employment status that are associated with migration.

In the absence of the kind of household sample statistics that would really permit us to carry the analysis much further, we shall have to make do with the 1961 Census data with all their limitations. These data may have potentialities unrealized by the writer but I believe that the analyses reported in the following pages extract the major part of what is possible out of this source of information. I would re-emphasize that the matter is not what should be possible with the available tabulations but what can in fact be done without the data without being swamped by sampling variation and enumeration error.[3]

I.3 EXPLANATORY VARIABLES

I.3.1 INCOME DIFFERENTIALS – The theoretical framework adopted in this study has as a primary requirement some measure of differential economic opportunities in the two regions that are exchanging population. One way of measuring these is by the differences in earnings from employment. Earnings other than those from employment should only be relevant if they are specific to the place of residence.[4] In practice, the choice comes down to national accounts data on personal income per worker or the average wage and salary earnings reported in the census. Both are problematic. The 1961 Census data have two serious drawbacks. They are limited to only a part of earnings from employment and, more significantly, they refer to the end of the period during which migration took place.

The first problem may be a minor one. Census wage earnings exclude unincorporated business earnings, especially those of farmers. To the extent

that farm earnings differ from non-farm earnings, and to the extent that migration includes the movement of farm workers to more remunerative non-farm situations, these data would tend to overstate the level of income of net losing areas. Just how serious this may be is not easy to infer. Migration off farms is not a large proportion of inter-provincial migration, yet is not insignificant. The proportion of inter-provincial migrants in Canada reporting farm residence in 1956 was 16 per cent.[5] The exclusion of farm income, however, may not affect the results of the regression analysis in any substantial way.

The fact that the data for wage and salary earnings pertain to the year preceding the 1961 Census, and so may reflect the consequence of migration, is probably more serious. The use of such data leaves open to some extent the causality of the relationship that is estimated.[6] If the result of migration over the period 1956-61 were to equalize the levels of wage earnings among the various regions, the problem would be so serious as to preclude the use of these data. I shall attempt to show, however, that whatever may have been the direct influence of migration on regional income differentials, there was, in fact, no narrowing of these differentials between 1956 and 1961. Presumably the effects of migration have been counterbalanced by opposing factors. That being the case, the census data on wage earnings should be usable and they are attractive in that they provide provincial earnings differentials that are specific to the sex, age and education groups that we wish to analyse. They also provide considerable occupational detail which is useful for making at least a partial correction for the differences in earnings between provinces that stem from differences in the composition of the work force. These are attractive reasons for preferring the census wage and salary data to national accounts personal income statistics.

In the particular case under study, it probably matters little whether one employs income data for 1956 or for 1961. There appears to have been little change in inter-provincial income differentials over this period, despite whatever equalizing influence inter-provincial migration may have had. No comparisons can be made for census wage earnings statistics, but provincial levels of per worker personal income in 1955-57 and 1960-62 are highly correlated. Three-year averages were compared so as to reduce the year-to-year variability caused mainly by changing agricultural conditions. The absolute income differences between the 21 pairs of provinces (treating the Atlantic Provinces together as a single region) in the two periods are highly correlated $(R = .94)$ and the slope of a regression of the 1960-62 differentials upon those for 1955-57 is not significantly different from unity.[7] Whatever effects inter-provincial migration may have had in the direction of equalizing provincial levels of income, they must have been

offset by opposing influences. Despite a considerable amount of migration from low income to high income provinces, the 1960-62 income differentials could be interchanged with those for 1955-57 with little effect on the outcome.

The limitations of the 1961 Census data on wage and salary earnings may not, therefore, be too serious. On the other hand, it has been pointed out that these data have advantages that support their use. For one thing, average earnings are reported for males in a great many different occupations. To some extent over-all provincial average earnings differ because of variations in occupational composition of workers among provinces. Within occupations, average earnings might be the same in all provinces. This is not in fact the case, but occupational compositional differences account for at least a part of the variation in average earnings among provinces. Differences in occupational earnings may largely be reflections of differences in skills and qualifications; hence it would be clearly advantageous for a worker to migrate without changing occupation only when his income could be raised. Crude provincial averages of wage earnings are adjusted here by a standardization procedure to remove the influence of compositional differences. I introduce a variable W^* which represents the earnings differentials that would prevail if all provinces had existing provincial levels of earnings in each occupation but the national average occupational composition.

Conceptually, W^* is a more attractive representation of earnings differentials than the crude average earnings (designated W) if the effects of occupational composition are at all important. Whether the differences between W^* and W are in fact significant is an open question. The comparison of the two sets of figures in Table I.1 suggests that only a rather small part of provincial differences in average earnings in Canada can be attributed to differences in occupational composition. On the other hand, "unfavourable" effects of occupational composition are found in the provinces with lower levels of income, especially the Atlantic Provinces, so that the use of W would tend to lead to over-predictions of migration from lower to higher income provinces. Detailed occupational data for standardizing wage earnings are not readily available by age so W^* for all ages is used in the following analysis, even for specific age groups. Where differences between W^* and W may be greater, as for specific educational groups, the unadjusted earnings differential W is used for that group.

The analysis was carried out using both W^* and Y, the average interprovincial differences in personal income per worker over the years 1955 to 1960.[8] In some cases results are reported alternatively for both variables so that the probable effects of selecting one or the other can be assessed.

Table I.1 – Effects of Occupational Composition on Provincial Levels of Wage and Salary Earnings, Canada and Provinces, 1961

Province	W[a]	W^*[b]	$(W/W^*.100)$	Relative levels[c]	
				W	W^*
Canada	3,679	3,679	100	100	100
Newfoundland	2,823	3,137	111	77	85
Prince Edward Island	2,359	2,546	108	64	69
Nova Scotia	3,021	3,055	101	82	83
New Brunswick	2,807	3,016	107	76	82
Quebec	3,469	3,516	101	94	96
Ontario	3,984	3,896	98	108	106
Manitoba	3,574	3,617	101	97	98
Saskatchewan	3,290	3,391	103	89	92
Alberta	3,733	3,611	97	101	98
British Columbia	4,005	3,997	100	109	109

[a] Actual earnings per capita.

[b] Earnings per capita standardized on the Canadian occupational composition (see preceding text).

[c] Relatives with respect to Canada.

SOURCE: 1961 Census, DBS 94-539.

I.3.2 OTHER EXPLANATORY VARIABLES – Explanatory variables other than income differentials can be rather quickly described. The most important is distance. The distance variable is introduced partly to capture the influence of costs of movement. Not all costs of migration vary with distance and indeed, variable costs may not be the most significant element. The distance variable is likely to be equally important as a proxy for the diminishing effect with distance of information about economic opportunities in other regions. It would be preferable to introduce these two factors directly and separately. Unfortunately, no appropriate measures could be found to do so. Moreover, if both of these influences were highly correlated with distance, it would be hard to find variables that contribute substantially independent effects. Finally, with only 21 observations, one must be economical in the use of explanatory variables.

Most of the results that are considered in the main text are those obtained with just income differentials and distance as explanatory variables. The role of several other variables is explored, though. One of these is intended to represent the principal source of information about economic opportunities in distant regions – "friends and relatives" – (measured by the number of persons born in the net losing region but residing in the net gaining region in 1956). The variable is designated B.[9]

An attempt is made to introduce some kind of dynamic or expectational element into the analysis through the use of a variable, called E, which is the ratio in the net gaining region to the net losing region of the per cent growth of per capita income over the five years preceding 1958. The use of such a variable is based on the notion that prospective migrants, looking ahead, might consider not just present income differentials but those that present trends indicate will exist at some time in the future.

The final variables that are considered relate to unemployment. A large part of the literature on migration uses regional unemployment differentials rather than income differences to represent economic opportunities. In some cases this has been due to the unavailability of regional income statistics but often it has reflected an *a priori* belief that "job-opportunities" are better indicated by a structural variable such as unemployment than by income and that labour tends to be relatively immobile with respect to differences in wages but more responsive to unemployment. The influence of unemployment is explored here through the use of two variables, U and U^*. The former is the average rate of unemployment in the net gaining region over the period 1956 - 60. It is intended to represent the influence of uncertainty about job prospects in areas of destination. U^* is an indicator of economic distress and is measured by the proportion of persons with unemployment insurance who have been receiving benefits for twenty weeks or more. This measure of "long-term unemployment" is also averaged over the period 1956 - 60.

There remains, finally, the form of the relationship to be estimated by regression analysis. There is little to draw on in the literature where a variety of forms have been utilized, and relatively little empirical experimentation was carried out for the present study. Two forms are used throughout as possible alternatives. The first is a simple linear relationship. In the absence of a strong presumption against it, this form has the advantage of being as simple as any. Arithmetic differences in earnings between regions are more consistent with the theoretical underpinnings of this study than would be the ratio of earnings in the two regions, a variable that is commonly used in "gravity" type models. Whether or not the influence of distance is proportional must ultimately be an empirical question. Charts 5.1 and 5.2 show the relationship between the migration of males of all ages and income differentials and distance. There is a hint in these graphs of a linear semi-logarithmic relationship that might be rationalized as a reflection of significant fixed costs to migration. If that were the case migration would be expected to rise more than proportionately as income differentials increased, especially beyond some minimum gain from migration. Also, distance would act less than proportionately as a deterrent to

Table I.2 – Data Series for Regression Analysis of the Net Interchange of 1956-61 Five-Year Migrants Among Pairs of Major Regions, Canada

Interchange	Variables								
	N_3[a]	N_4[b]	N_5[c]	N_6[d]	N_7[e]	N_{21}[f]	N_{22}[g]	N_{31}[h]	N_{32}[i]
Atlantic – Quebec	1,216	1,536	713	1,878	496	52	46	58	50
Atlantic – Ontario	3,731	4,401	1,858	5,214	1,433	126	116	166	109
Atlantic – Manitoba	64	97	150	191	117	6	7	21	14
Atlantic – Saskatchewan	19	0	47	8	11	0	8	6	2
Atlantic – Alberta	257	447	218	542	122	9	5	24	19
Atlantic – British Columbia	162	345	214	458	308	3	11	25	30
Quebec – Ontario	1,694	1,706	881	2,603	1,771	151	241	52	85
Quebec – Manitoba	78	122	194	282	180	3	3	24	28
Quebec – Saskatchewan	17	14	14	8	10	1	9	3	3
Quebec – Alberta	50	9	36	33	94	3	6	8	11
Quebec – British Columbia	115	275	167	398	248	7	9	29	33
Ontario – Manitoba	123	611	594	1,074	543	12	53	60	27
Ontario – Saskatchewan	265	330	198	622	433	5	38	27	39
Ontario – Alberta	472	719	305	664	9	10	5	63	18
Ontario – British Columbia	299	392	216	472	335	36	8	68	99
Manitoba – Saskatchewan	509	362	85	557	294	1	22	8	37
Manitoba – Alberta	446	936	653	1,376	677	40	59	65	72
Manitoba – British Columbia	575	797	469	1,340	1,173	3	110	57	180
Saskatchewan – Alberta	1,943	3,154	2,036	4,287	2,117	105	193	204	178
Saskatchewan – British Columbia	994	1,371	904	2,155	1,722	113	193	101	232
Alberta – British Columbia	341	179	233	529	1,388	9	105	15	225

[a] Net provincial interchanges, males 15-24.
[b] Net provincial interchanges, males 20-34.
[c] Net provincial interchanges, males 25-34.
[d] Net provincial interchanges, males 20-44.
[e] Net provincial interchanges, males 35+.
[f] Net provincial interchanges, males 25-34 with elementary schooling.
[g] Net provincial interchanges, males 35+ with elementary schooling.
[h] Net provincial interchanges, males 25-34 with secondary schooling.
[i] Net provincial interchanges, males 35+ with secondary schooling.

Table I.2 – Data Series for Regression Analysis of the Net Interchange of 1956-61 Five-Year Migrants Among Pairs of Major Regions, Canada – concluded

Interchange	Variables								
	N_2[a]	P_2[b]	Y[c]	W^*[d]	D[e]	B[f]	U[g]	U^*[h]	E[i]
Atlantic – Quebec	2,952	3,597	341	478	766	60	8.0	6.1	1.04
Atlantic – Ontario	8,332	4,099	1,212	858	1,215	114	3.6	6.1	1.39
Atlantic – Manitoba	321	1,433	742	579	2,373	3	10.6	2.4	.67
Atlantic – Saskatchewan	12	1,445	534	353	2,974	3	10.6	3.4	1.26
Atlantic – Alberta	674	1,654	952	573	3,287	15	3.3	6.1	1.35
Atlantic – British Columbia	717	1,794	1,577	959	4,058	27	4.8	6.1	1.11
Quebec – Ontario	6,174	5,766	871	380	355	138	3.6	3.6	1.33
Quebec – Manitoba	636	3,100	401	101	1,519	9	8.0	2.4	.70
Quebec – Saskatchewan	22	3,111	193	125	1,985	6	8.0	3.4	1.32
Quebec – Alberta	63	3,321	611	95	2,409	13	3.3	3.6	1.29
Quebec – British Columbia	729	3,461	1,236	481	3,197	16	4.8	3.6	1.07
Ontario – Manitoba	1,857	3,603	470	279	1,380	54	3.6	2.4	.93
Ontario – Saskatchewan	1,310	3,614	678	505	1,847	49	3.6	3.4	1.75
Ontario – Alberta	825	3,824	260	285	2,272	50	3.3	2.3	.97
Ontario – British Columbia	1,286	3,964	365	101	3,059	73	4.8	2.3	.80
Manitoba – Saskatchewan	1,023	948	208	226	466	41	3.1	3.4	1.87
Manitoba – Alberta	2,169	1,158	210	6	890	31	3.3	2.4	.91
Manitoba – British Columbia	3,525	1,298	835	380	1,679	71	4.8	2.4	.75
Saskatchewan – Alberta	8,186	1,169	418	220	442	81	3.3	3.4	1.70
Saskatchewan – British Columbia	5,788	1,309	1,043	606	1,248	122	4.8	3.4	1.40
Alberta – British Columbia	3,443	1,518	625	386	892	93	4.8	2.1	.82

[a] Net interchange of males of all ages.
[b] Sum of male population in both regions in 1961.
[c] Average difference between the two regions in personal income per member of the labour force over the years 1955-60.
[d] Interprovincial differences in annual wage and salary earnings in the 12 months preceding June 1, 1961, standardized for provincial differences in occupational composition.
[e] Highway mileage between principal provincial urban centres (averages weighted by population used for provinces with more than one principal centre).
[f] Number of persons born in net losing provinces residing in net gaining provinces in 1956.
[g] Unemployed as a per cent of labour force, in net gaining area, average for years 1956-60.
[h] Unemployment insurance claimants with "live file" of 20 weeks or more as a percentage of insurance books issued.
[i] Ratio of percentage growth in personal income per capita 1954-59 in net gaining to that in net losing area.

migration. In the regression analysis that is reported here equations are fitted that are linear but they use migration and the log of migration alternatively as dependent variables. Appendix Table I.2 presents the values of the variables that are used in the several regressions.

FOOTNOTES TO APPENDIX I

[1] One of the main conclusions reached as a result of the present study is that there is a serious need for such micro data. Indeed, I would argue the real progress in the analysis of migration will come only out of the study of individual household statistics collected by special surveys.

[2] The rate n_{ij} is of the form $\dfrac{N_{ij}}{P_i + P_j}$. In many migration models, especially those that have foundations in theories of the "gravity" type, the rate that is used is of the form $\dfrac{N_{ij}}{P_i\, P_j}$. The rates that are used here are not interpreted as any precise representations of migration probabilities but rather as rough corrections from large differences in regional population size.

[3] Nothing has been said here about the general weaknesses and limitations of the 1961 Census sample data on migration. These have been aptly covered in other Chapters of this study.

[4] For example, bond interest or dividends should affect decisions about where to migrate although provincial government transfer payments might.

[5] The proportion of inter-provincial migrants off farms is computed from DBS, 1961 Census, 98-509, Table 13.

[6] This difficulty points to an important weakness for analytical purposes of the 1961 Census data on migration. What detail and cross-tabulations are available are for characteristics of the census year 1961. The choice of the five-year period, 1956-61, was in many ways most unfortunate. There are relatively little data available for 1956 of the sort that one would prefer to have for analytical work. The income data are a good case in point but the problem is a general one. The Census of 1956 was so restricted as to the information collected that it makes a poor base for migration analysis. Failure to relate to a base period with a usable body of data greatly diminishes the value of the 1961 Census migration statistics.

[7] The slope is estimated to be 1.03. The constant term does not differ significantly from zero.

[8] The timing is selection on the assumption that the timing of migration may lag slightly behind the emergence of economic opportunity. Y is calculated from the national accounts totals of personal income for each province divided by the estimated labour force for each year for the week ending closest to June 1. Annual labour force figures for individual Prairie Provinces were estimated by allocating the Prairie total among the provinces on the basis of crude estimates of labour force made by applying 1961 participation ratios to the population, age by age, of each province annually from 1955 to 1960.

[9] The use of such a variable is vigorously recommended by the work of Phillip Nelson, 1959. He makes a strong case of a dominant role of information.

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1961 CENSUS MONOGRAPHS
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Migration in Canada – *Leroy O. Stone*
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Trends in Canadian Marketing – *M.S. Moyer and G. Snyder*
Trends and Factors of Fertility in Canada – *Jacques Henripin*
The Impact of Immigration on Canada's Population – *Warren E. Kalbach*

Labour Force Studies

Historical Estimates of the Canadian Labour Force – *Frank T. Denton and Sylvia Ostry*
The Growth of Manpower in Canada – *Frank T. Denton*

The following by Sylvia Ostry –
Provincial Differences in Labour Force Participation
The Occupational Composition of the Canadian Labour Force
Unemployment in Canada
The Female Worker in Canada
Geographical Composition of the Canadian Labour Force

The Census Monograph studies listed above were published during 1968 and 1969 or were in the printing process at the end of the latter year. At that time, the fifth title was available in French only and the seventh and ninth were available in English and French. The list will be augmented as work on other studies progresses. Copies may be secured from the Queen's Printer, Ottawa, or the Dominion Bureau of Statistics (Publications Distribution Unit).